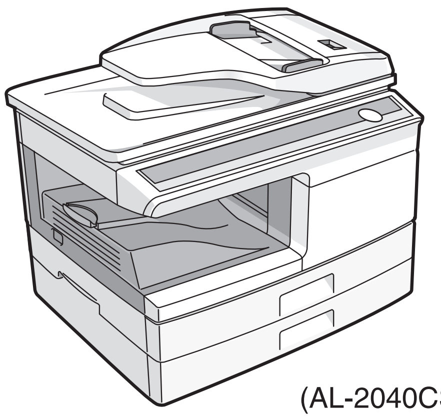
SHARP

SERVICE MANUAL

CODE: 00ZAL2040CS1E



(AL-2040CS)

DIGITAL MULTIFUNCTIONAL SYSTEM

MODEL AL-2030 AL-2040CS

CONTENTS

Parts marked with "⚠" are important for maintaining the safety of the set. Be sure to replace these parts with specified ones for maintaining the safety and performance of the set.

SHARP CORPORATION

CAUTION

This product is a class 1 laser product that complies with 21CFR 1040 of the CDRH standard and IEC825. This means that this machine does not produce hazardous laser radiation. The use of controls, adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

This laser radiation is not a danger to the skin, but when an exact focusing of the laser beam is achieved on the eye's retina, there is the danger of spot damage to the retina.

The following cautions must be observed to avoid exposure of the laser beam to your eyes at the time of servicing.

1) When a problem in the laser optical unit has occurred, the whole optical unit must be exchanged as a unit, not as individual parts.
2) Do not look into the machine with the main switch turned on after removing the developer unit, toner cartridge, and drum cartridge.
3) Do not look into the laser beam exposure slit of the laser optical unit with the connector connected when removing and installing the optical system.
4) The middle frame contains the safety interlock switch.

   Do not defeat the safety interlock by inserting wedges or other items into the switch slot.

CLASS 1
LASER PRODUCT

LASER KLASSE 1

LASER WAVE – LENGTH : 770 ~ 795nm
Pulse times : 12.88µs ± 12.88ns/7mm
Out put power : MAX 0.2mW

CAUTION

INVISIBLE LASER RADIATION,
WHEN OPEN AND INTERLOCKS DEFEATED.
AVOID EXPOSURE TO BEAM.

VORSICHT

UNSICHTBARE LASERSTRAHLUNG,
WENN ABDECKUNG GEÖFFNET UND
SICHERHEITSVERRIEGELUNG ÜBERBRÜCKT.
NICHT DEM STRAHL AUSSETZEN.

VARO !

AVATTAESSA JA SUOJALUKITUS
OHITETTAESSA OLET ALTTIINA
NÄKYMÄTTÖMÄLLE LASERSÄTEILYLLE ÄLÄ
KATSO SÄTEESEEN.

ADVARSEL

USYNLIG LASERSTRÅLNING VED ÅBNING, NÅR
SIKKERHEDSBRYDERE ER UDE AF
FUNKTION. UNDGÅ UDSAETTELSE FOR
STRÅLNING.

VARNING !

OSYNLIG LASERSTRÅLNING NÄR DENNA DEL
ÄR ÖPPNAD OCH SPÄRREN ÄR URKOPPLAD.
BETRAKTA EJ STRÅLEN. – STRÅLEN ÄR
FARLIG.

At the production line, the output power of the scanner unit is adjusted to 0.57 MILLI-WATT PLUS 20 PCTS and is maintained constant by the operation of the Automatic Power Control (APC). Even if the APC circuit fails in operation for some reason, the maximum output power will only be 15 MILLI-WATT 0.1 MICRO-SEC. Giving and accessible emission level of 42 MICRO-WATT which is still-less than the limit of CLASS-1 laser product.

Caution
This product contains a low power laser device. To ensure continued safety do not remove any cover or attempt to gain access to the inside of the product. Refer all servicing to qualified personnel.

Laserstrahl

CAUTION CLASS 3B INVISIBLE LASER RADIATION WHEN OPEN AND INTERLOCKS DEFEATED. AVOID EXPOSURE TO BEAM.

VORSICHT UNSICHTBARE LASERSTRAHLUNG DER KLASSE 3B , WENN ABDECKUNG GEÖFFNET UND SICHERHEITSVERRIEGELUNG ÜBERERÜCKT. NICHT DEM STRAHL AUSSETZEN.

ADVARSEL USYNLIG LASERSTRÅLING AF KLASSE 3B VED ÅBNING, NÅR SIKKERHEDSAFBRYDERE ER UDE AF FUNKTION. UNDGÅ UDSAETTELSE FOR STRÅLING.

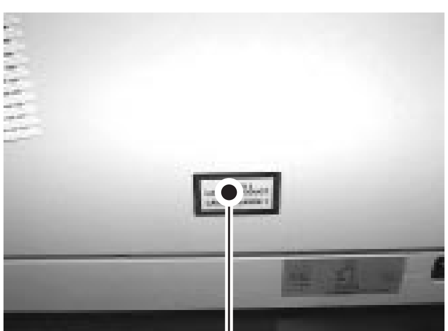
ADVERSEL USYNLIG KLASSE 3B LASERSTRÅLING NÅR DEKSEL ÅPNES OG SIKKERHEDSLÅS BRYTES. UNNGÅ EKSPONERING FOR STRÅLEN.

VARNING OSYNLIG LASERSTRÅLNING KLASS 3B NÄR DENNA DEL ÄR ÖPPNAD OCH SPÄRRAR ÄR URKOPPLADE. UNDVIK EXPONERING FÖR STÅRLEN

VARO! AVATTAESSA JA SUOJALUKITUS OHITETTAESSA OLET ALTTIINA NÄKYMÄTÖNTÄ LUOKAN 3B LASERSÄTEILYLLE. ÄLÄ KATSO SÄTEESEEN.

>PET<





The foregoing is applicable only to the 220V model, 230V model and 240V model.

VAROITUS! LAITTEEN KÄYTTÄMINEN MUULLA KUIN TÄSSÄ KÄYTTÖOHJEESSA MAINITULLA TAVALLA SAATTAA ALTISTAA KÄYTTÄJÄN TURVALLISUUSLUOKAN 1 YLITTÄVÄLLE NÄKYMÄTTÖMÄLLE LASERSÄTEILYLLE.

VARNING - OM APPARATEN ANVÄNDS PÅ ANNAT SÄTT ÄN I DENNA BRUKSANVISNING SPECIFICERATS, KAN ANVÄNDAREN UTSÄTTAS FÖR OSYNLIG LASERSTRÅLNING, SOM ÖVERSKRIDER GRÄNSEN FÖR LASERKLASS 1.

CLASS 1
LASER PRODUCT

LASER KLASSE 1

LUOKAN 1 LASERLAITE
KLASS 1 LASER APPARAT

CONTENTS

[1] GENERAL

1. Major functions

Configurations

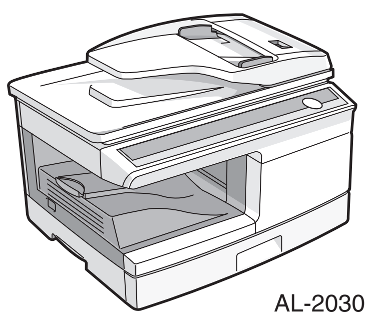
Model \ Item	CPM (Letter)	PPM (Letter)	SB/MB	2 Tray	SPF	R-SPF	Color Scanner	GDI printer	PCL printer	E-SORT	Duplex	Shifter	RJ45	FAX
AL-2030	20CPM	16PPM	MB	×	○	×	×	○	×	×	×	×	×	×
AL-2040CS	20CPM	16PPM	MB	○	○	×	○	○	×	×	○	×	○ (print only)	×

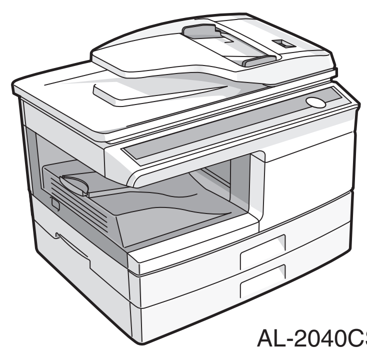
Descriptions of items

CPM: Copy speed (Copies Per Minute)
PPM: Print speed (Print Per Minute)
SB/MB: SB = Manual feed single bypass, MB = Manual feed multi-bypass
2 tray: Second cassette unit.
SPF: Original feed unit
R-SPF: Duplex original feed unit
Color scanner: Color scanner function
GDI printer: GDI printer function with USB.
PCL printer: PCL printer function with USB.
E-SORT: Electronic sort function
Duplex: Auto duplex copy/print function
Shifter: Job separator function
FAX: FAX function.

Descriptions of table

○: Standard provision
×: No function or no option available
Opt: Option


AL-2030


AL-2040CS

[2] SPECIFICATIONS

1. Basic Specifications

Item			
Type		Desktop	
Copy system		Dry, electrostatic	
Segment (class)		Digital personal copier	
Copier dimensions	AL-2030	20-1/2" (W) x 17-5/8" (D) x 14-1/8" (H) (518mm (W) x 445mm (D) x 358mm (H))	
	AL-2040CS	20-1/2" (W) x 17-5/8" (D) x 17-5/8" (H) (518mm (W) x 445mm (D) x 445mm (H))	
Weight (Approximately)	AL-2030	37.9 lbs. (17.2Kg)	TD cartridge not included
	AL-2040CS	45.9 lbs. (20.8Kg)	

2. Operation specifications

Section, item			Details	
Paper feed section	Paper feed system		AL-2030	1 tray (250 sheet) + multi-bypass (50 sheet)
			AL-2040CS	2 tray (500 sheet) + multi-bypass (50 sheet)
	Inch system	Tray paper feed section	Paper size	8-1/2" x 14", 8-1/2 x 11", 8-1/2" x 5-1/2" (Landscape)
			Paper weight	15 - 21 lbs.
			Paper feed capacity	250 sheets
			Kinds	Standard paper, specified paper, recycled paper
			Remark	User adjustment of paper guide available
		Multi-bypass paper feed section	Paper size	8-1/2" x 14", 8-1/2 x 11", 8-1/2" x 5-1/2", 3-1/2" x 5-1/2" (Landscape)
			Paper weight	15 - 34.5 lbs.
			Paper feed capacity	50 sheets
			Kinds	Standard paper, specified paper, recycled paper, OHP, Label, Envelop (Single copy)
			Remark	User adjustment of paper guide available
	AB system	Tray paper feed section	Paper size	A4, B5, A5 (Landscape)
			Paper weight	56 - 80g/m^2 (15 - 21 lbs.)
			Paper feed capacity	250 sheets
			Kinds	Standard paper, specified paper, recycled paper
			Remark	User adjustment of paper guide available
		Multi-bypass paper feed section	Paper size	A4, B5, A5, B6, A6 (Landscape)
			Paper weight	56 - 128g/m^2 (15 - 34.5 lbs.)
			Paper feed capacity	50 sheets
			Kinds	Standard paper, specified paper, recycled paper, OHP, Label, (Single copy)
			Remark	User adjustment of paper guide available
Paper exit section		Exit way		Face down
		Capacity of output tray		100 sheets
Originals		Original set		Center Registration (left edge)
		Max. original size		8-1/2" x 14" (A4)
		Original kinds		sheet, book
		Original size detection		None
Optical section	Scanning section	Scanning system		3 CCDs (RGB) sensor scanning by lighting white lamp
		CCD sensor	Resolution	600 dpi
		Lighting lamp	Type	CCFL
			Voltage	560Vrms
			Power consumption	2.8W
		Output data		Output: R, G, B 1 or 8 bits/pixel / Input: A/D 16 bits (12 bits actual)
	Writing section	Writing system		Writing to OPC drum by the semiconductor laser
		Laser unit	Resolution	600 dpi

Section, item		Details	
Image forming	Photoconductor	Type	OPC (30ø)
		Life	18k
	Charger	Charging system	Saw-tooth charging with a grid, / (-) scorotron discharge
		Transfer system	(+) DC corotron system
		Separation system	(-) DC corotron system
	Developing	Developing system	Dry, 2-component magnetic brush development system
	Cleaning	Cleaning system	Counter blade system (Counter to rotation)
Fusing section	Fusing system		Heat roller system
	Upper heat roller	Type	Teflon roller
	Lower heat roller	Type	Silicon rubber roller
	Heater lamp	Type	Halogen lamp
		Voltage	120V
		Power consumption	800W
Electrical section	Power source	Voltage	120V
		Frequency	Common use for 50 and 60Hz
	Power consumption	Max.	Less than 1000W
		Average (during copying)	350Wh/H
		Average (stand-by)	80Wh/H
		Pre-heat mode	25Wh/H
		Auto power shut-off mode	8.8W or less

3. Copy performance

Section, item			Details	AL-2030	AL-2040CS
Copy magnification		Fixed magnification ratios		4 Reduction + 3 Enlargement (AB system: 50, 70, 86, 100, 141, 200%) (Inch system: 50, 64, 78, 100, 129, 200%)	
		Zooming magnification ratios		25 - 400% (376 steps in 1% increments) 50 - 200% when using SPF	
Manual steps (manual, photo)				5 steps	
Copy speed		First-copy time *1 (Approximately)		8.0 seconds (When user program 24 is set to OFF) 10.7 seconds (When user program 24 is set to ON) (paper: 8-1/2" x 11" (A4), exposure mode: AUTO, copy ratio: 100%)	
	Inch system 8-1/2" x 11" (Landscape)	Copy speed (CPM)	Same size	20	20
			Enlargement	20	20
			Reduction	20	20
	AB system A4 (Landscape)	Copy speed (CPM)	Same size	20	20
			Enlargement	20	20
			Reduction	20	20
	AB system B5 (Landscape)	Copy speed (CPM)	Same size	20	20
			Enlargement	20	20
			Reduction	20	20
Max. continuous copy quantity				99	
Void		Void area	Leading edge	1 - 4mm	
			Trailing edge	4mm or less	
			Side edge void area	0.5mm or more (per side) 4.5mm or less (total of both sides)	
		Image loss	Leading edge	same size: 3.0mm or less (OC) / 4mm or less (SPF/Duplex) Enlarge: 1 - 5mm or less (OC) / 3mm or less (SPF/Duplex) Reduction (50%): 6.0mm or less (OC) / 8mm or less (SPF/Duplex)	
Warm-up time				0 sec. Immediately the ready lamp is lit.	
Power save mode reset time				0 sec. Immediately the ready lamp is lit.	
Paper jam recovery time				0 sec. * Jam recovery condition: Recovery time from 60 sec of door open.	

*1: The first-copy time is measured after the power save indicator turns off following power on, using the document glass with the polygon rotating in the copy ready state and "Selection of copy start state" set to ON in the user programs (8-1/2" x 11" (A4), paper fed from paper tray).

The first-copy time may vary depending on machine operating conditions and ambient conditions such as temperature.

4. GDI Printer

Print speed	Max. 20ppm (excluding bypass tray, paper size A4, 8.5" x 11") (Variable depending on the PC performance)
Duplex	Yes (AL-2040CS only)
Memory	8MB (Duplex model: 16MB)
Interface	USB 2.0 (Full speed) / (RJ45 (10Base-T) AL-2040CS only)
Network	Built-in NIC (AL-2040CS only)
Emulation	GDI
Resolution	600dpi *1
Supported OS	Win 98 / Me / 2000 / XP / Vista *2
WHQL support	Yes *2

*1: Engine Resolution

*2: By running change

5. Scan function

Type	Flat Bed Color Scanner
Scanning system	Original table/SPF
Light source	3 CCDs (RGB) sensor scanning by lighting white lamp (2 pcs of CCFL)
Resolution	Optical: 600 x 600dpi Setting range: 50 - 9600dpi (Preview resolution is fixed at 75dpi)
Originals	Sheet type / Book type
Output data	R, G, B 1 or 8 bits/pixel
Scan range	OC / SPF: 8.5" (H) x 14.0" (V) Original position: Left Center
Scan speed	OC / SPF: Max. 2.88ms/line
Protocol	TWAIN / WIA (Only XP) / STI
Interface	USB2.0 (Full speed support)
Scanner utility	Button Manager / Sharpdesk / Composer
Scan key/lamp	Yes
Duplex scan	No
Supported OS	Win 98 / Me / 2000 / XP / Vista *1
Void area	No (User settable by PC)
WHQL supported	Yes *1

*1: By running change

6. SPF

Original capacity	50 sheets (14 to 23.9 lbs.) (56 to 90g/m^2) Stacking Height: less than 6.5mm or 1/4"
Original size	8-1/2" x 14" to 5-1/2" x 8-1/2" / A4 to A5 (Landscape)
Original replacement speed	Max. 14 sheets (70%)
Original placement	Face up
Original weight	14 - 23.9lbs. (56 to 90g/m^2)
Mixed feeding (Paper size)	No
Original which cannot	Thermal papers, originals with punch holes for files, be used folded paper, transparent originals such as OHP films, stapled or clip used originals with cover up liquid used, Originals with tape sealed, originals with high level frictional coefficient such as photos or catalogs.

[3] CONSUMABLE PARTS

1. Supply system table

Common to all destinations

No.	Name	Content	Life	Product name	Package
1	Develop cartridge (Black) x 1	Toner/developer cartridge x 1 (Toner: Net weight 213g) (Developer: Net weight 190g)	6K (5% document)	AL-100TD	5
2	Develop cartridge (Black) x 1	Toner/developer cartridge x 1 (Toner: Net weight 124g) (Developer: Net weight 190g)	4K (5% document)	AL-110TD	5
3	Drum cartridge	Drum cartridge	18K	AL-100DR	5

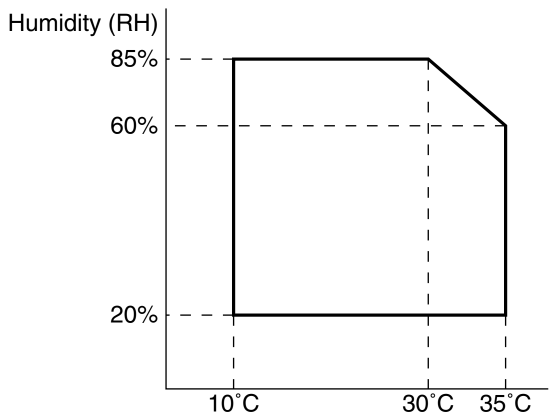
2. Environmental

The environmental conditions for assuring the copy quality and the machine operations are as follows:

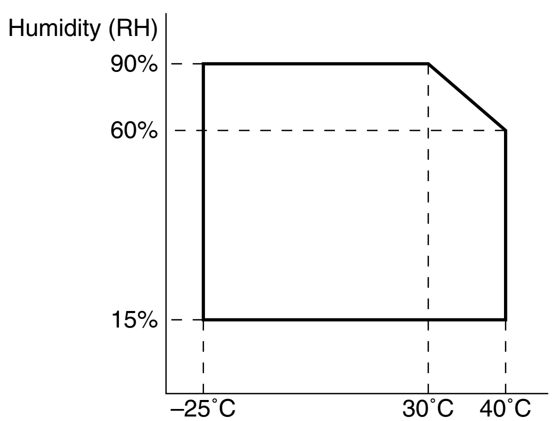
(1) Normal operating condition

Temperature: 20 - 25°C
Humidity: 65 ± 5%RH

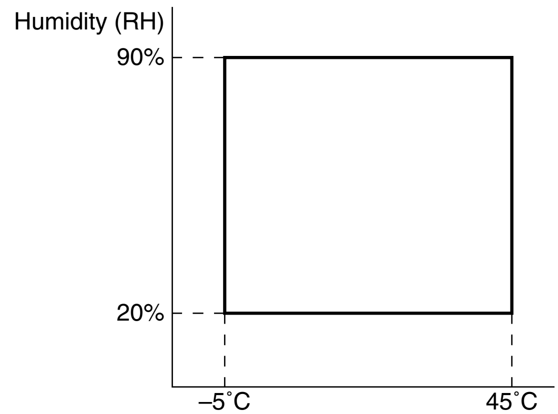
(2) Acceptable operating condition



(3) Transport condition



(4) Supply storage condition

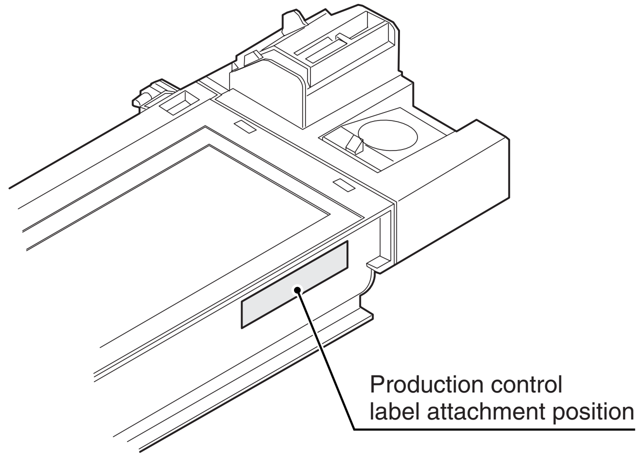


3. Production control number (lot No.) identification

<Developing cartridge>

○ ○ ○ ○ ○ ○ ○

- Production month
- Production day
- Destination code (Dealer, distributor, OEM, etc.)
- Production place (SOCC: Fixed to B.)
- End digit of year
- Version No.



∗ Destination

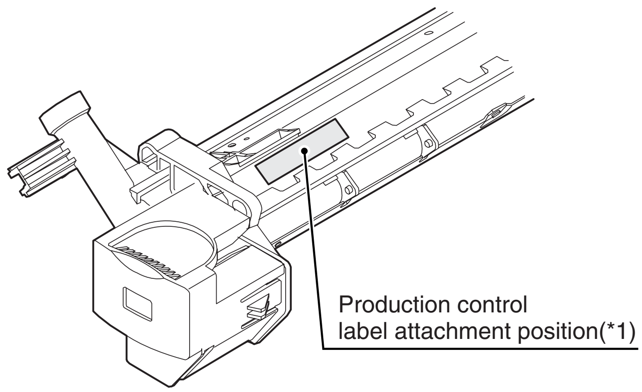
Division		No.
EX Destination	A same pack	G
	B same pack	H
Option Destination	A	P
	B	Q

<Drum cartridge>

The label on the drum cartridge shows the date of production.
(SOCC production)

○ ○ ○ ○ ○ ○ ○

- Production month
- Production day
- Destination code (Dealer, distributor, OEM, etc.)
- Production place (SOCC: Fixed to B.)
- End digit of year
- Version No.



*1: The production control label is not attached to the cartridge of a China product.

<JAPAN production>

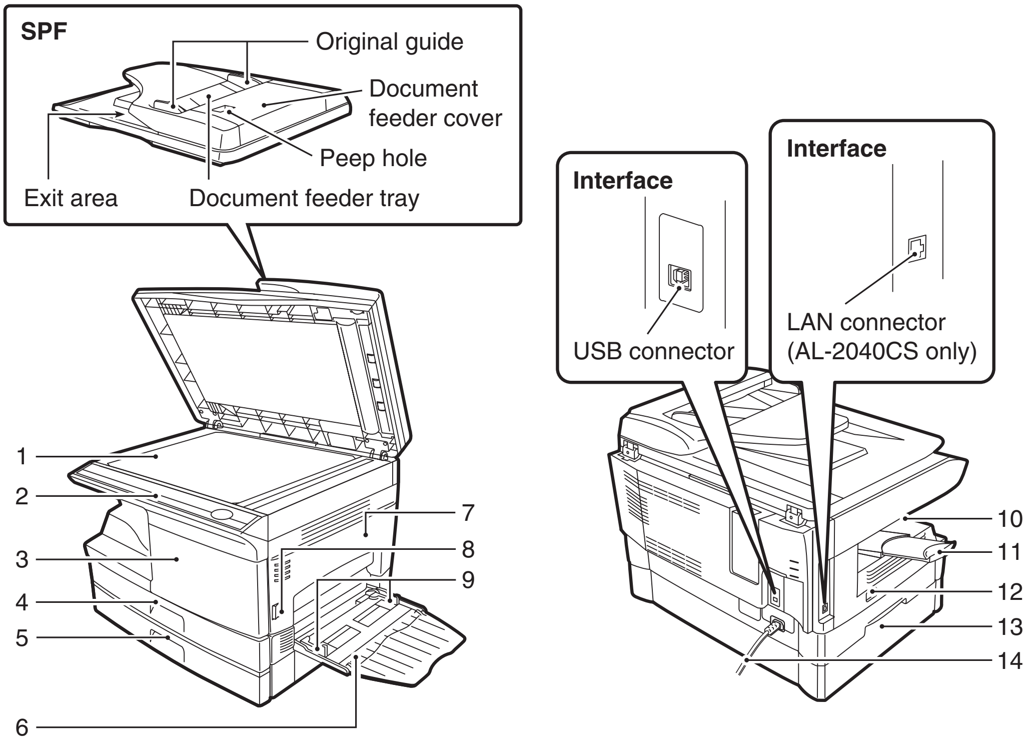
Ver.A 9 1 1 0001 X

- X: Production month (1 - 9 = Jan. - Sep. 0 = Oct. X = Nov. Y = Dec.)
- 0001: Serial number of month
- 1: Fixed to 1.
- 1: Pack division (See table below)
- 9: End digit of year
- Ver.A: Version No.

Division	No.
Ex production	1
Option	2
Same pack	3

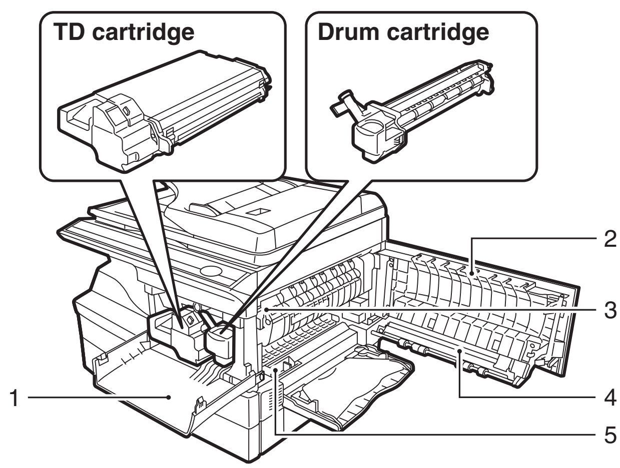
[4] EXTERNAL VIEWS AND INTERNAL STRUCTURES

1. Appearance



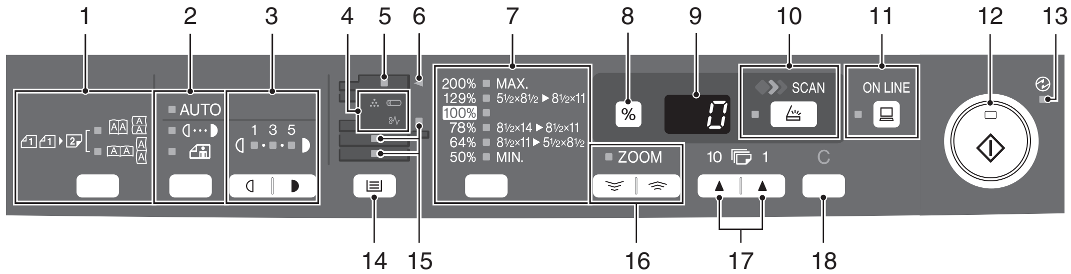
1	Document glass	2	Operation panel	3	Front cover
4	Paper tray 1	5	Paper tray 2 (AL-2040CS only)	6	Multi-bypass tray
7	Side cover	8	Side cover open button	9	Bypass tray paper guides
10	Paper output tray	11	Paper output tray extension	12	Power switch
13	Handle	14	Power cord		

2. Internal



1	Front cover	2	Side cover	3	Fusing unit release lever
4	Transfer charger	5	Charger cleaner		

3. Operation panel



1	**Original to copy key and indicators (AL-2040CS only)** Two-sided copies from one-sided originals. Turn on Long Edge or Turn on Short Edge can be selected.	2	**Exposure mode selector key and indicators** Use to sequentially select the exposure modes: AUTO, MANUAL or PHOTO. Selected mode is shown by a lit indicator.
3	**Light and dark keys and indicators** Use to adjust the MANUAL or PHOTO exposure level. Selected exposure level is shown by a lit indicator. Use to start and terminate user program setting.	4	**Alarm indicators** Drum replacement required indicator *1 Misfeed indicator TD cartridge replacement required indicator *2
5	**SPF indicator**	6	**SPF misfeed indicator**
7	**Copy ratio selector key and indicators** Use to sequentially select preset reduction/enlargement copy ratios. Selected copy ratio is shown by a lit indicator.	8	**Copy ratio display (%) key** • Use to verify a zoom setting without changing the zoom ratio. • Use to check the number of originals that must be returned to the document feeder tray if an original misfeed occurs while using the SPF.
9	**Display** Displays the specified copy quantity, zoom copy ratio, user program code, and error code.	10	**SCAN key and indicator (AL-2040CS only) *3, *4**
11	**ONLINE key and indicator** Lights up when the unit is used as a printer and scanner (AL-2040CS only). *3	12	**Start key and indicator** • Copying is possible when the indicator is on. • Press to start copying • Use to set a user program.
13	**Power save indicator** Lights up when the unit is in a power save mode.	14	**Tray select key** Use to select a paper feed station (paper tray 1, paper tray 2 (AL-2040CS only) or multi-bypass tray).
15	**Paper feed location indicators** Light up to show the selected paper feed station.	16	**ZOOM keys and indicator** Use to select any reduction or enlargement copy ratio from 25% to 400% in 1% increments. (When the SPF is being used, the zoom copy ratio range is 50% to 200%.)
17	**Copy quantity keys** • Use to select the desired copy quantity (1 to 99). • Use to make user program entries.	18	**Clear key** • Press to clear the display, or press during a copy run to terminate copying. • Press and hold down during standby to display the total number of copies made to date.

***1: Drum cartridge replacement**

The useful life of the drum cartridge is approximately 18,000 copies*. When the internal counter reaches approximately 17,000 copies, the drum replacement required ( ) indicator will light up indicating that replacement of the drum cartridge will be needed soon. For more information on purchasing the drum cartridge, please refer to the Operation Manual. When the indicator begins to blink, the unit will stop operating until the cartridge is replaced. Replace the drum cartridge at this time.

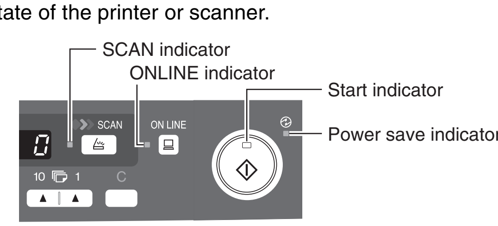
*: Based on copying onto letter size paper at 5% toned area.

***2: TD cartridge replacement**

The TD cartridge replacement required ( ) indicator will light up when toner is needed. For more information on purchasing the TD cartridge. If copying is continued while the indicator is lit, copies will gradually become lighter until the unit stops and the indicator begins blinking.

***3: Indicators on the operation panel**

The ONLINE indicator and the start ( ) indicator indicate the state of the printer or scanner.



Start indicator

On: Indicates the unit is ready for copying or scanning is being performed.

Blinking: The indicator blinks in the following situations:
- When a print job is interrupted.
- When reserving a copy job.
- When toner is being replenished during a copy or print job.

Off: The indicator is off in the following situations:
- During copying or scanning.
- The unit is in the auto power shut-off mode.
- When a misfeed or error has occurred.

ONLINE indicator

The ONLINE key is pressed and on line and off line are changed.

On: Indicates the unit is ready for printing or scanning is being performed. (On line)

Blinking: Printing or data is being received from a computer.

Off: Copying is being performed. (Off line)

Power save indicator

On: Indicates the unit is in a power save mode.

Blinking: Indicates that the unit is initializing (when the side cover is opened and closed or the power turned off and on).

SCAN indicator (AL-2040CS only)

On: The SCAN ( ) key has been pressed and the unit is in scanner mode.

Blinking: A scan job is being executed from the computer, or scan data is stored in the unit's memory.

Off: The unit is in the copy mode.

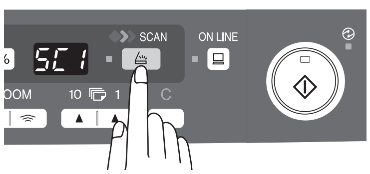
***4: Using the SCAN key to begin scanning**

Note:

- Scanning is not possible during a copy job.
- If the SCAN ( ) key is pressed during a print job, the scan job will be stored.
- When scanning an original that has been placed in the SPF, only one original can be placed unless you are using Sharp-desk.

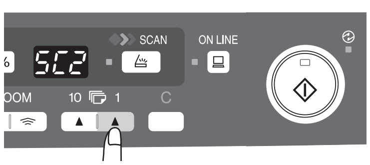
1) Press the SCAN ( ) key.

   The unit enters scan mode.



2) Place the original you wish to scan on the document glass/SPF.
3) Press the right copy quantity key to display the number of the application that you wish to use for scanning.

   The application numbers are initially as follows.

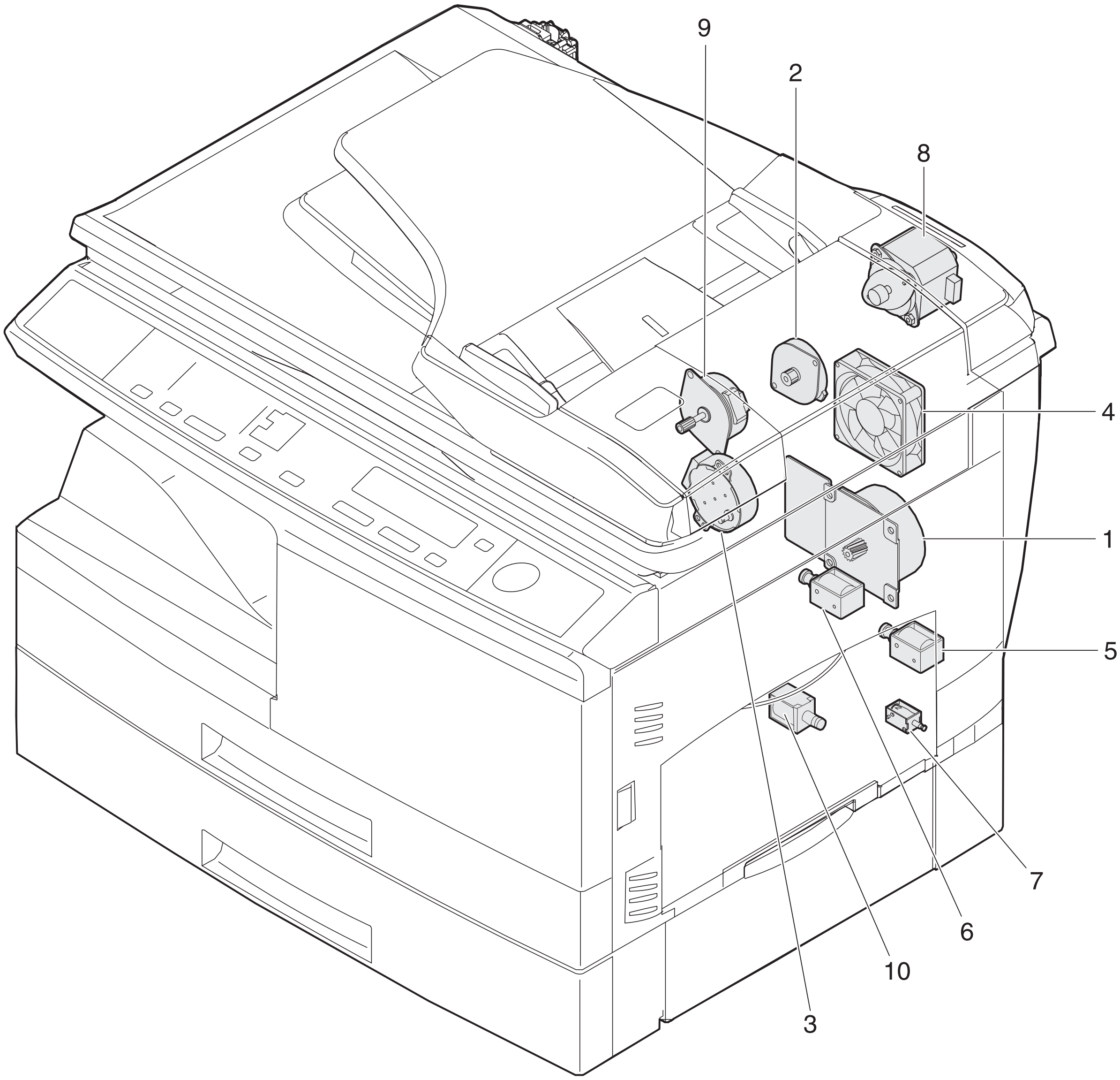


Application number	Application launched
SC1	Sharpdesk (Full color) (if installed)
SC2	Sharpdesk (Monochrome) (if installed)
SC3	E-mail (your standard e-mail program in the Windows OS you are using)
SC4	Fax (if a fax program is installed)
SC5	OCR (if an OCR program is installed)
SC6	Microsoft Word (if installed)

4) Press the start ( ) key.

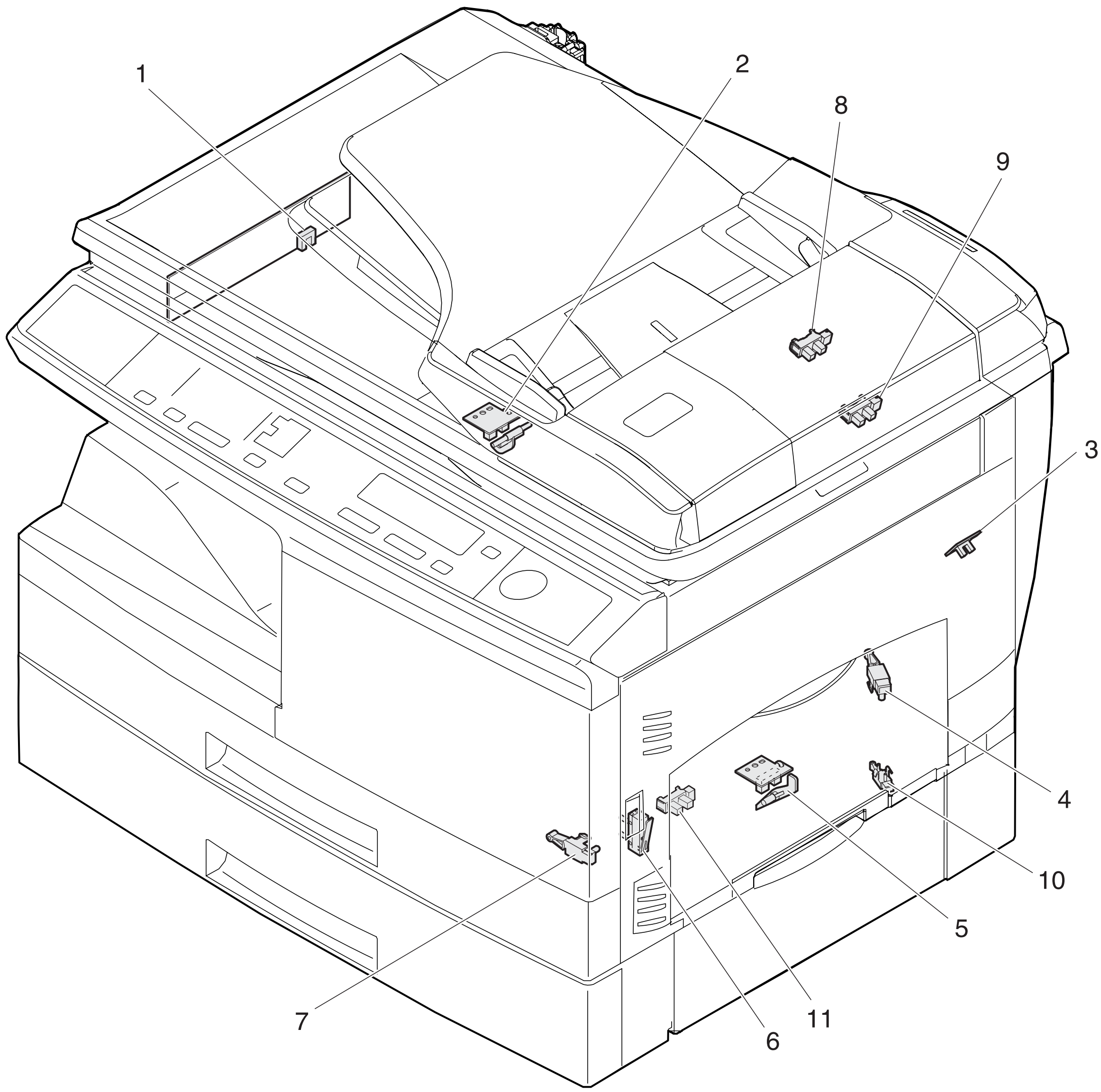
   Scanning will start and the scanned data will be transferred to the application.

4. Motors and solenoids



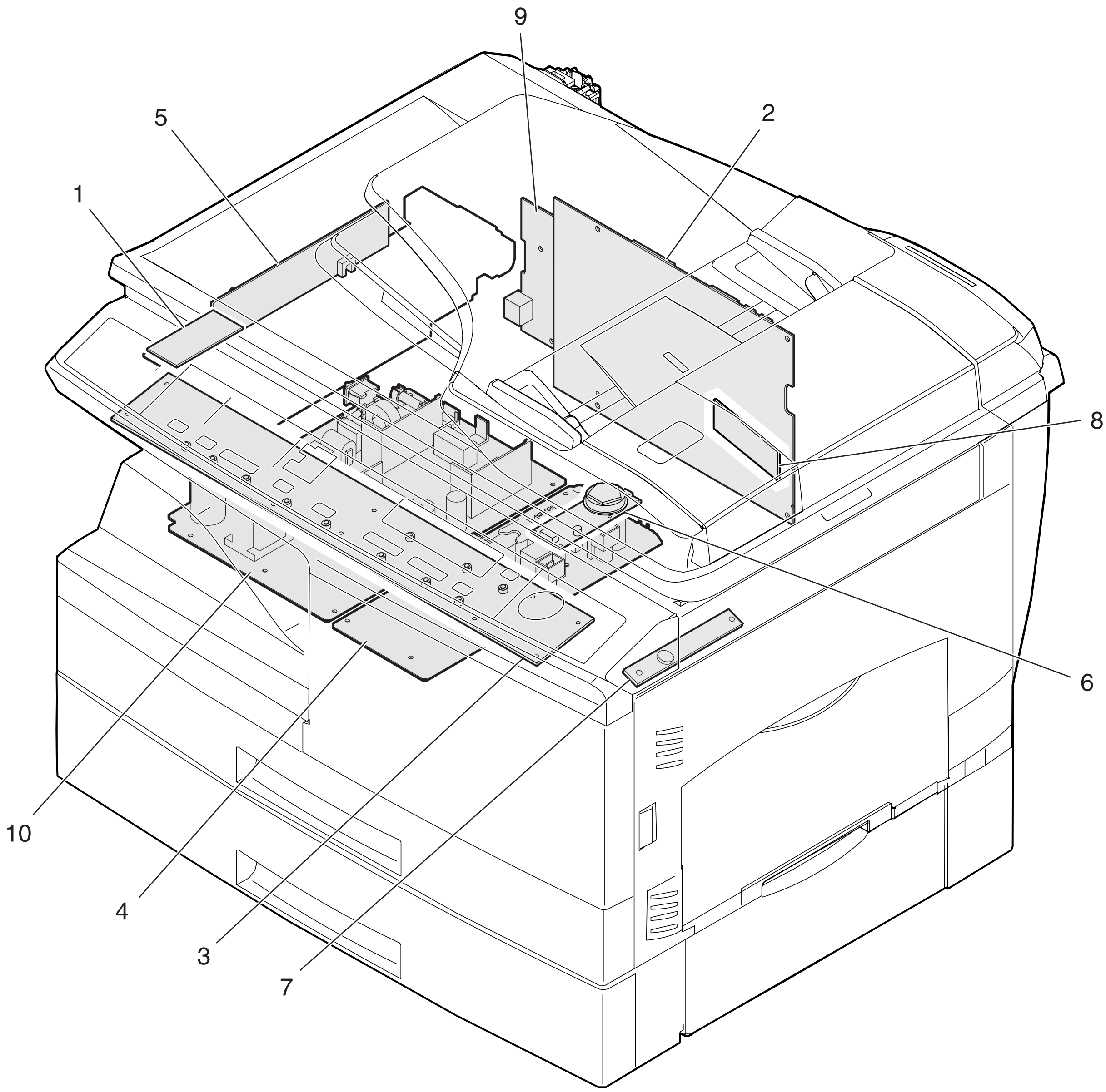
No.	Part name	Control signal	Function / Operation
1	Main motor	MM	Drives the copier.
2	Scanner motor	MRMT	Drives the optical mirror base (scanner unit).
3	Toner motor	TM	Supplies toner.
4	Cooling fan motor	VFM	Cools the optical, fusing section.
5	Resist roller solenoid	RRS	Resist roller rotation control solenoid
6	Paper feed solenoid	CPFS1	Cassette Paper feed solenoid 1
7	Multi paper feed solenoid	MPFS	Multi manual pages feed solenoid
8	SPF motor	SPFM	Drives the single pass feeder
9	Duplex motor	DMT	Devices the duplex paper transport section
10	Paper feed solenoid	CPFS2	Cassette Paper feed solenoid 2

5. Sensors and switches



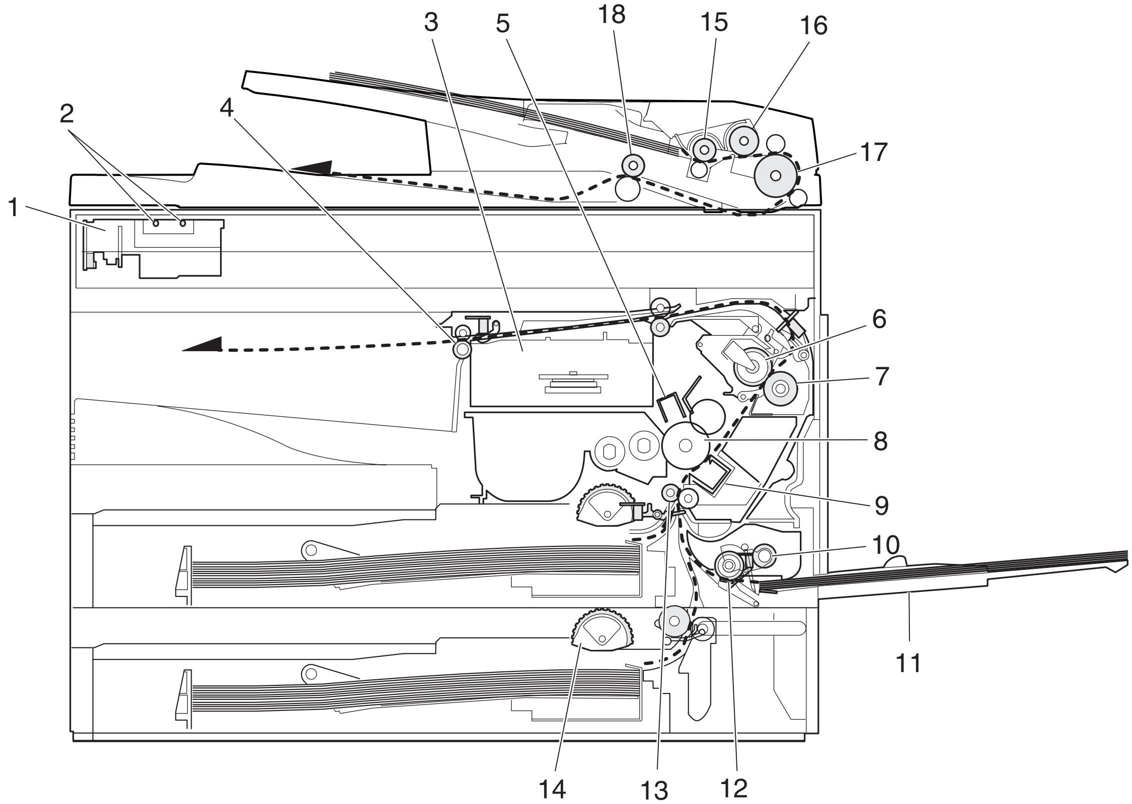
No.	Name	Signal	Type	Function	Output
1	Scanner unit home position sensor	MHPS	Transmission sensor	Scanner unit home position detection	"H" at home position
2	POD sensor	POD	Transmission sensor	Paper exit detection	"H" at paper pass
3	PPD2 sensor	PPD2	Transmission sensor	Paper transport detection 2	"L" at paper pass
4	Cassette detection switch	CED1	Micro-switch	Cassette installation detection	"H" at cassette insertion
5	PPD1 sensor	PPD1	Transmission sensor	Paper transport detection 1	"L" at paper pass
6	Door switch	DSW	Micro-switch	Door open/close detection (safety switch for 24V)	1 or 0V of 24V at door open
7	Drum reset switch	DRST	Micro-switch	New drum detection switch	Instantaneously "H" at insertion of new drum
8	SPF sensor	SPID/ SD SW	Transmission sensor	Paper entry detection Cover open/close detection	"L" at paper pass
9	SPPD sensor	SPPD	Transmission sensor	Paper transport detection	"L" at paper pass
10	2nd cassette	DSW	Micro-switch	2nd cassette door open detection	1 or 0V of 5V at door open
11	PPD3 sensor	PPD3	Transmission sensor	Paper transport detection 3	"L" at paper pass

6. PWB unit



No.	Name	Function
1	Exposure lamp invertor PWB	Exposure lamp (CCFL) control
2	Main PWB (MCU)	Copier control
3	Operation PWB	Operation input/display
4	High voltage PWB	High voltage control
5	CCD sensor PWB	For image scanning
6	LSU motor PWB	For polygon motor drive
7	TCS PWB	For toner sensor control
8	LSU PWB	For laser control
9	NIC PWB	Network print control (AL-2040CS only)
10	Power PWB	AC power input, DC voltage control

7. Cross sectional view



No.	Part name	Function and operation
1	Scanner unit	Illuminates the original with the copy lamp and passes the reflected light to the lens unit(CCD).
2	Exposure lamp	Exposure lamp (CCFL) Illuminates original
3	LSU (Laser unit)	Converts the original image signal into laser beams and writes onto the drum.
4	Paper exit roller	Roller for paper exit
5	Main charger	Provides negative charges evenly to the drum surface.
6	Heat roller	Fuses toner on the paper. (Teflon roller)
7	Pressure roller	Fuses toner on the paper. (Silicon rubber roller)
8	Drum	Forms images.
9	Transfer unit	Transfers images onto the drum.
10	Pickup roller	Picks up the manual feed paper. (In multi feed only)
11	Manual paper feed tray	Tray for manual feed paper
12	Manual paper feed roller	Transport the paper from the manual paper feed port.
13	PS roller unit	Takes synchronization between the lead edge and the rear edge of the paper.
14	Paper feed roller	Picks up a sheet of paper from the cassette.
15	Pickup roller	Picks up documents.
16	Separation roller	Separates documents to feed properly.
17	PS roller	Feeds documents to the scanning section.
18	Paper exit roller	Discharges documents.

[5] UNPACKING AND INSTALLATION

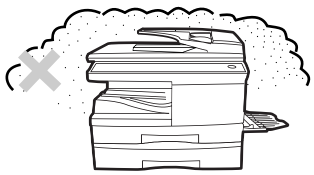
1. Copier installation

Improper installation may damage the copier. Please note the following during initial installation and whenever the copier is moved.

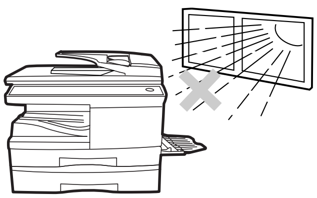
Caution: If the copier is moved from a cool place to a warm place, condensation may form inside the copier. Operation in this condition will cause poor copy quality and malfunctions.
Leave the copier at room temperature for at least 2 hours before use.

Do not install your copier in areas that are:

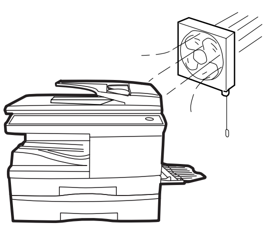
- damp, humid, or very dusty



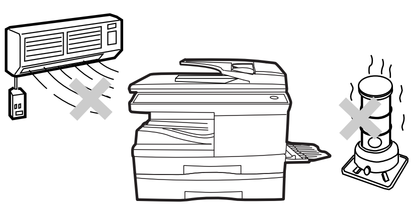
- exposed to direct sunlight



- poorly ventilated



- subject to extreme temperature or humidity changes, e.g., near an air conditioner or heater.

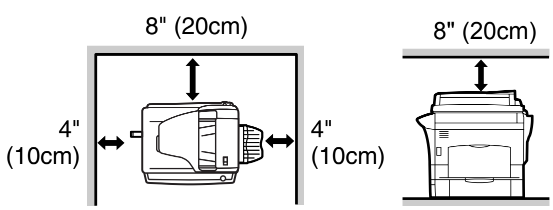


The copier should be installed near an accessible power outlet for easy connection.

Be sure to connect the power cord only to a power outlet that meets the specified voltage and current requirements.

Also make certain the outlet is properly grounded.

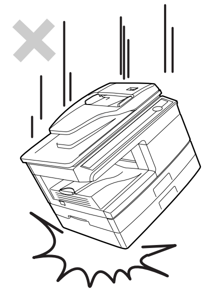
Be sure to allow the required space around the machine for servicing and proper ventilation.



2. Cautions on handling

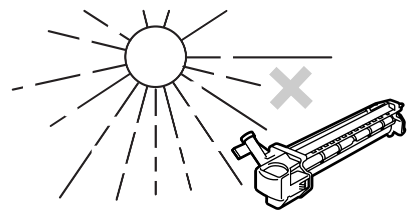
Be careful in handling the copier as follows to maintain the performance of this copier.

Do not drop the copier, subject it to shock or strike it against any object.



Do not expose the drum cartridge to direct sunlight.

Doing so will damage the surface (green portion) of the drum cartridge, causing poor print quality.



Store spare supplies such as drum cartridges and TD cartridges in a dark place without removing from the package before use.

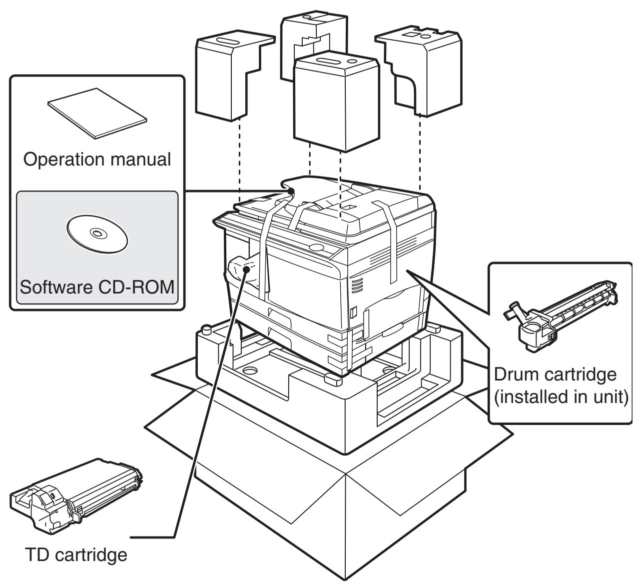
If they are exposed to direct sunlight, poor print quality may result.

Do not touch the surface (green portion) of the drum cartridge.

Doing so will damage the surface of the cartridge, causing poor print quality.

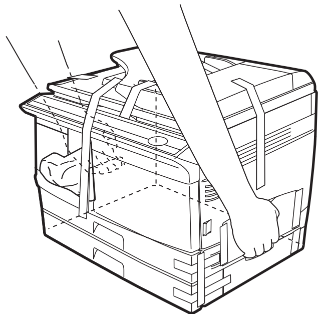
3. Checking packed components and accessories

Open the carton and check if the following components and accessories are included.



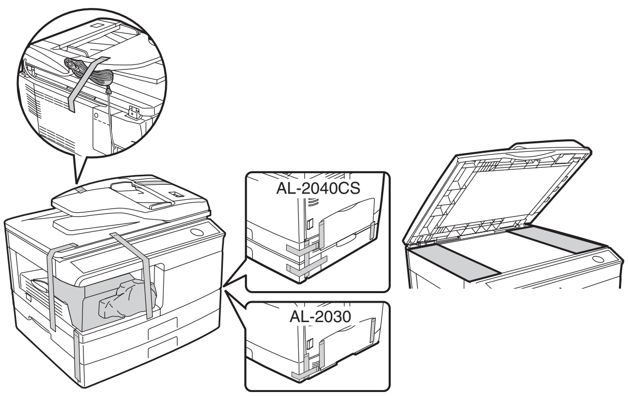
4. Unpacking

Be sure to hold the handles on both sides of the unit to unpack the unit and carry it to the installation location.



5. Removing protective packing materials

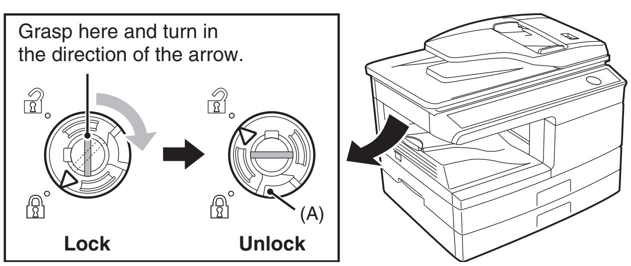
1) Remove all pieces of tape shown in the illustration below. Then open the SPF and remove protective materials. After that, take out the bag containing the TD cartridge.



2) Release the scan head locking switch.

   The scan head locking switch is under the document glass.

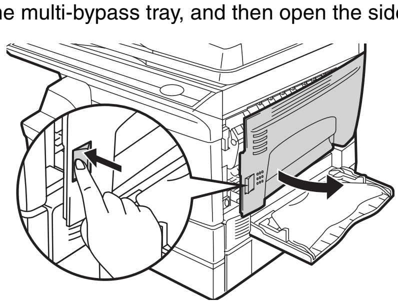
   If the switch is locked (🔒), the unit will not operate. Unlock the switch (🔓) as shown below.



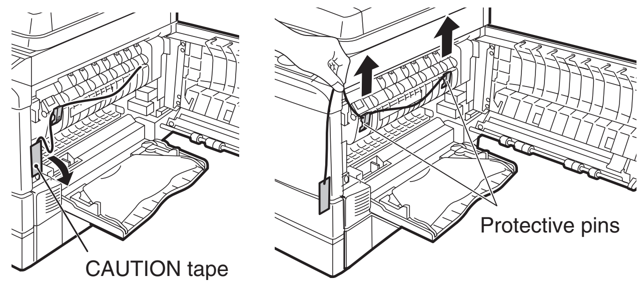
   To lock the scan head locking switch, hold up the catch in illustration (A) and turn the center knob counter-clockwise 90 degrees until you hear a click.

6. Installing the TD cartridge

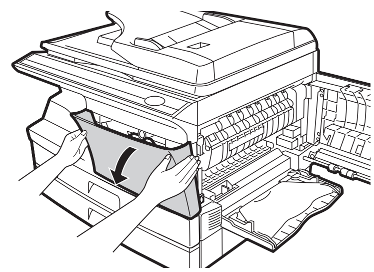
1) Open the multi-bypass tray, and then open the side cover.



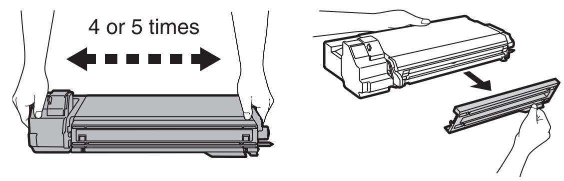
2) Remove the CAUTION tape from the front cover and remove the two protective pins from the fusing unit by pulling the strings upward one at a time.



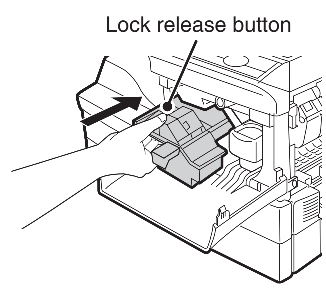
3) Push gently on both sides of the front cover to open the cover.



4) Remove the TD cartridge from the bag. Remove the protective paper. Hold the cartridge on both sides and shake it horizontally four or five times. Hold the tab of the protective cover and pull the tab to your side to remove the cover.

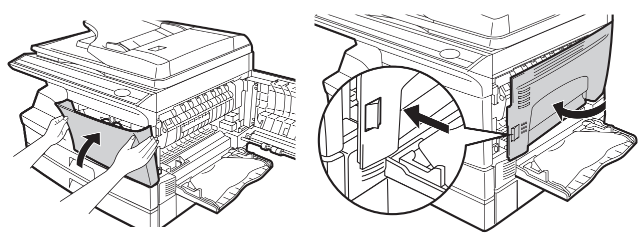


5) Gently insert the TD cartridge until it locks in place while pushing the lock release button.



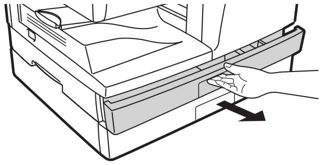
6) Close the front cover and then the side cover by pressing the round projections near the side cover open button.

Caution: When closing the covers, be sure to close the front cover securely and then close the side cover. If the covers are closed in the wrong order, the covers may be damaged.

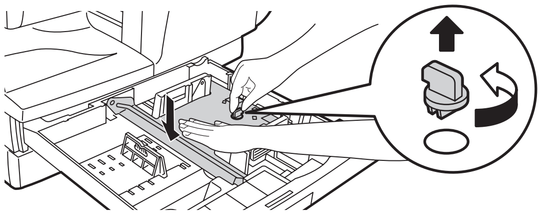


7. Loading paper

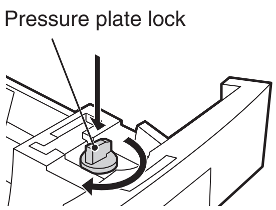
1) Raise the handle of the paper tray and pull the paper tray out until it stops.



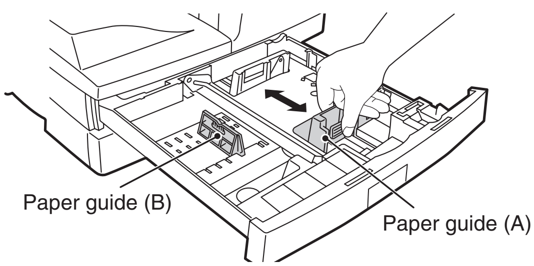
2) Remove the pressure plate lock. Rotate the pressure plate lock in the direction of the arrow to remove it while pressing down the pressure plate of the paper tray.



3) Store the pressure plate lock which has been removed in step 2). To store the pressure plate lock, rotate the lock to fix it on the relevant location.

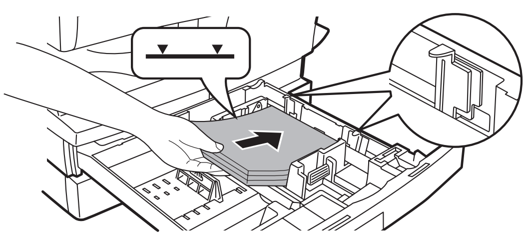


4) Adjust the paper guides on the paper tray to the copy paper width and length. Squeeze the lever of paper guide (A) and slide the guide to match with the width of the paper. Move paper guide (B) to the appropriate slot as marked on the tray.



5) Fan the paper and insert it into the tray. Make sure the edges go under the corner hooks.

Note: Do not load paper above the maximum height line (▼ ▼). Exceeding the line will cause a paper misfeed.



6) Gently push the paper tray back into the unit.

8. Power to copier

Ensure that the power switch of the unit is in the OFF position. Plug the other end of the power cord into the nearest outlet. Turn the power switch on the left side of the unit to the "ON" position. The start ( ) indicator will light up and other indicators which show the initial settings of the operation panel will also light up to indicate the ready condition.

9. Software

The CD-ROM that accompanies the machine contains the following software:

Printer driver (AL-2030)

The printer driver enables you to use the printer function of the machine.

The printer driver includes the Print Status Window. This is a utility that monitors the machine and informs you of the printing status, the name of the document currently being printed, and error messages.

Please note that the printing over a network connection is not possible.

MFP driver (AL-2040CS)

Printer driver

The printer driver enables you to use the printer function of the machine.

The printer driver includes the Print Status Window. This is a utility that monitors the machine and informs you of the printing status, the name of the document currently being printed, and error messages.

Please note that the Print Status Window does not operate when the machine is used as a network printer.

Scanner driver*

The scanner driver allows you to use the scanning function of the machine with TWAIN-compliant and WIA-compliant applications.

Sharpdesk* (AL-2040CS)

Sharpdesk is an integrated software environment that makes it easy to manage documents and image files, and launch applications.

Button Manager* (AL-2040CS)

Button Manager allows you to use the scanner menus on the machine to scan a document.

*: The scanning feature can only be used with computers that are connected to the machine by a USB cable. If you are connected to the machine by a LAN connection, only the printer function can be used.

Before installation

Hardware and software requirements

Check the following hardware and software requirements in order to install the software.

Computer type	IBM PC/AT or compatible computer equipped with a USB 2.0/1.1*1 or 10Base-T LAN interface
Operating system*2 *3	Windows 98, Windows Me, Windows 2000 Professional*4, Windows XP Professional*4, Windows XP Home Edition*4
Display	800 x 600 dots (SVGA) display with 256 colors (or better)
Hard disk free space	150 MB or more
Other hardware requirements	An environment on which any of the operating systems listed above can fully operate

*1: Compatible with Windows 98, Windows Me, Windows 2000 Professional, Windows XP Professional or Windows XP Home Edition preinstalled model standardly equipped with a USB port.

*2: Printing is not available in MS-DOS mode.

*3: The machine does not support printing from a Macintosh environment.

*4: Administrator's rights are required to install the software using the installer.

Installation environment and usable software

The following table shows the drivers and software that can be installed for each version of Windows and interface connection method.

Cable	Operating system	Printer driver	Scanner driver	Button Manager	Sharpdesk
USB	Windows 98/ Me/2000/XP	Available*1	Available		
LAN	Windows 98/ Me/2000/XP		Not Available*2		

*1: The printer driver that is installed will vary depending on the type of connection between the machine and your computer.

*2: Although it is possible to install Button Manager and Sharpdesk on Windows 98/Me/2000/XP, neither Button Manager nor the scanner function of Sharpdesk can actually be used.

Install the software according to the Operation Manual.

10. Connecting the interface cable

Connecting a USB cable

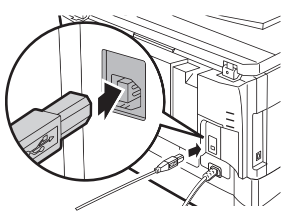
Follow the procedure below to connect the machine to your computer.

A USB cable for connecting the machine to your computer is not included with the machine. Please purchase the appropriate cable for your computer.

Caution:

- USB is available with a PC/AT compatible computer that was originally equipped with USB and had Windows 98, Windows Me, Windows 2000 Professional, Windows XP Professional or Windows XP Home Edition preinstalled.
- Do not connect the USB cable before installing the printer driver. The USB cable should be connected during installation of the printer driver.

1) Insert the cable into the USB connector on the machine.



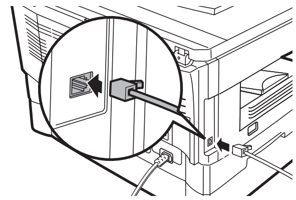
2) Insert the other end of the cable into your computer's USB port.

Using the machine as a network printer (AL-2040CS only)

Note:

- Interface cables for connecting the machine to your computer are not included with the machine. Please purchase the appropriate cable for your computer.
- If you intend to use the machine as a scanner, it must be connected to your computer with a USB interface cable. The scanner function cannot be used if the machine is connected with a LAN cable.

1) Insert the LAN cable into the LAN connector on the machine. Use a network cable that is shielded.



2) Turn on the machine.

3) Set up according to the Operation Manual.

11. Interface

A. USB

Connector

4-pin ACON UBR23-4K2200

Type-B connector

Cable

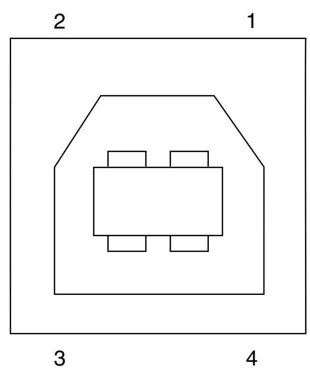
Shielded twisted pair cable

(2 m (6 feet) Max.: high-speed transmission equivalent)

Pin configuration

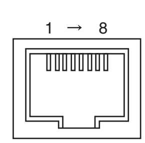
The pin numbers and signal names are listed in the following table.

Pin No.	Signal name
1	+5V
2	-DATA
3	+DATA
4	GND



B. RJ45

RJ-45 connector pin arrangement



Pin No.	Signal name	LAN adapter RJ-45 connector
1	TD+	Send output +
2	TD–	Send output -
3	RD+	Receive input +
6	RD–	Receive input -
4, 5, 7, 8	Not used.	Not used.

12. Moving

Moving instructions

When moving the unit, follow the procedure below.

Note: When moving this unit, be sure to remove the TD cartridge in advance.

1) Turn the power switch off and remove the power cord from the outlet.
2) Open the side cover and front cover, in that order. Remove the TD cartridge and close the front cover and side cover, in that order.

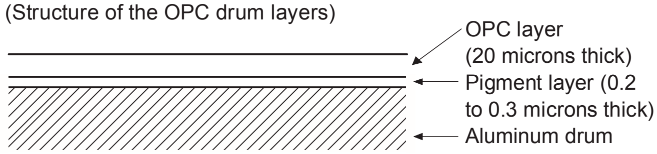
   To open and close the side cover and front cover, and to remove the TD cartridge.
3) Raise the handle of the paper tray and pull the paper tray out until it stops.
4) Push the center of the pressure plate down until it locks in place and lock the plate using the pressure plate lock which has been stored in the front of the paper tray.
5) Push the paper tray back into the unit.
6) Lock the scan head locking switch.

Note: When shipping the unit, the scan head locking switch must be locked to prevent shipping damage.

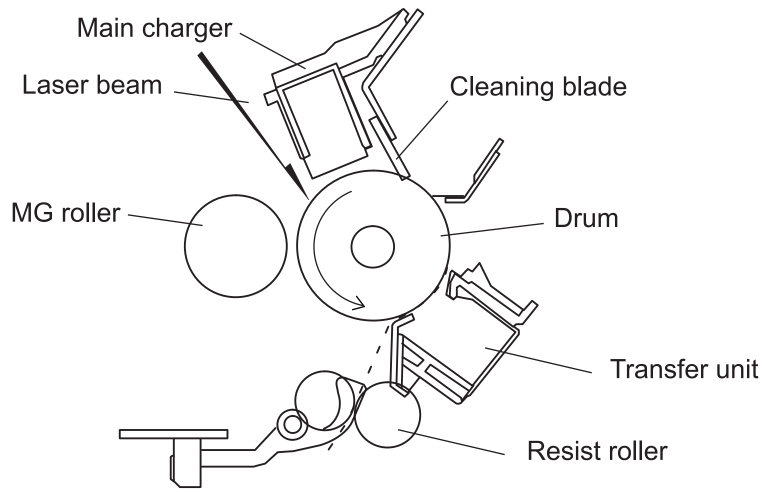
7) Close the multi-bypass tray and the paper output tray extension, and attach the packing materials and tape which were removed during installation of the unit.
8) Pack the unit into the carton.

[6] COPY PROCESS

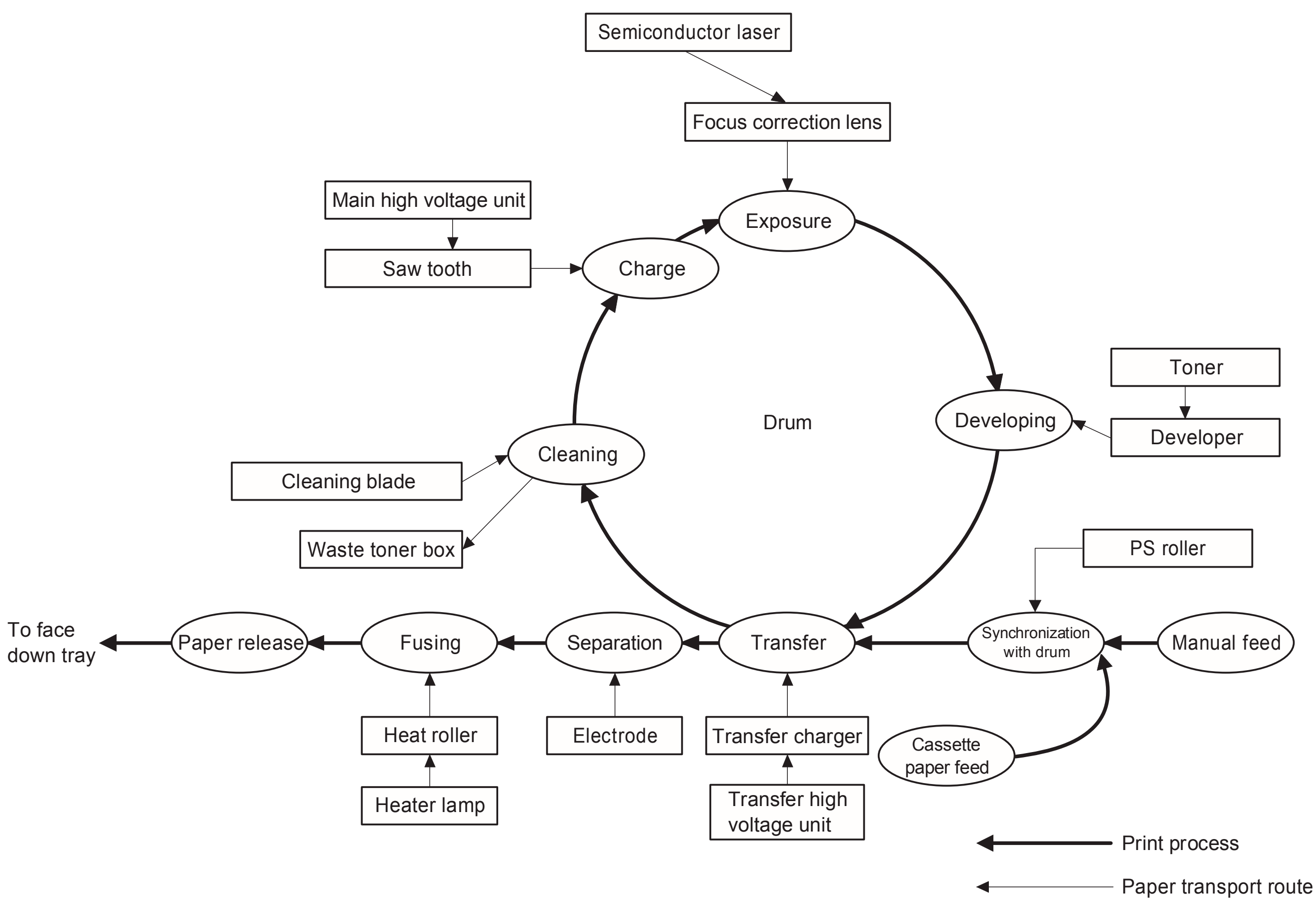
An OPC drum is used for the photoconductor.
(Structure of the OPC drum layers)



1. Functional diagram



(Basic operation cycle)



2. Outline of print process

This printer is a non-impact printer that uses a semiconductor laser and electrostatic print process. This printer uses an OPC (Organic Photo Conductor) for its photoconductive material.

First, voltage from the main corona unit charges the drum surface and a latent image is formed on the drum surface using a laser beam. This latent image forms a visible image on the drum surface when toner is applied. The toner image is then transferred onto the print paper by the transfer corona and fused on the print paper in the fusing section with a combination of heat and pressure.

Step-1: Charge

Step-2: Exposure

* Latent image is formed on the drum.

Step-3: Developing
Latent image formed on the drum is then changed into visible image with toner.

Step-4: Transfer
The visible image (toner image) on the drum is transferred onto the print paper.

Step-5: Cleaning
Residual toner on the drum surface is removed and collected by the cleaning blade.

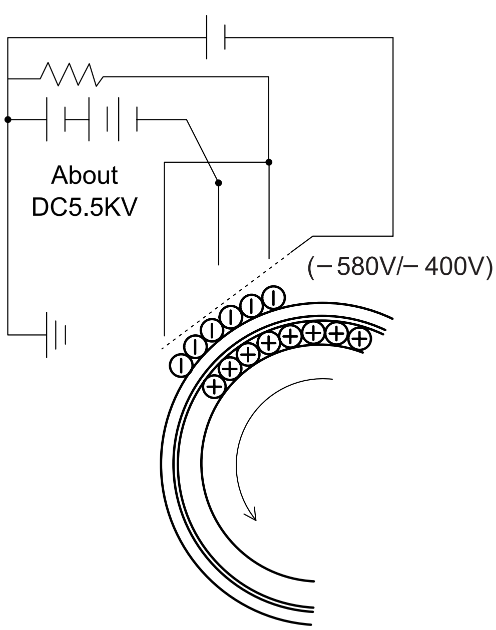
Step-6: Optical discharge
Residual charge on the drum surface is removed, by semiconductor laser beam.

3. Actual print process

Step-1: DC charge

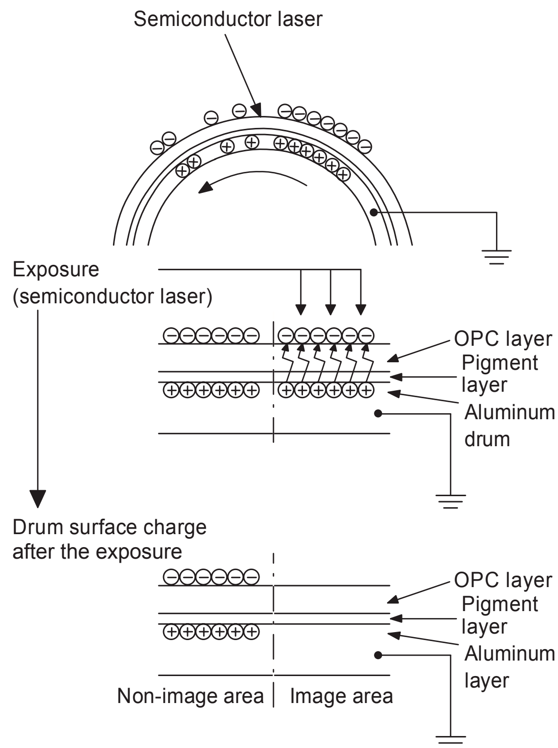
A uniform negative charge is applied over the OPC drum surface by the main charging unit. Stable potential is maintained by means of the Scorotron charger.

Positive charges are generated in the aluminum layer.



Step-2: Exposure (laser beam, lens)

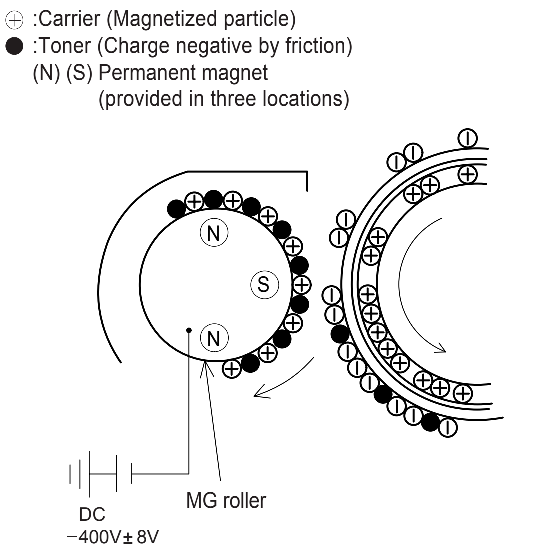
A Laser beam is generated from the semiconductor laser and controlled by the print pattern signal. The laser writes onto the OPC drum surface through the polygon mirrors and lens. The resistance of the OPC layer decreases for an area exposed by the laser beam (corresponding to the print pattern signal). The beam neutralizes the negative charge. An electrostatic latent image is formed on the drum surface.

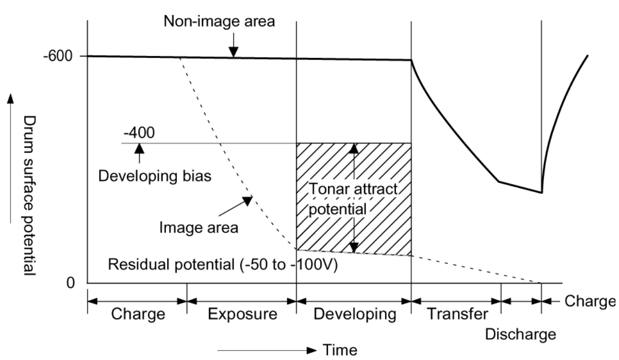


Step-3: Developing (DC bias)

A bias potential is applied to the MG roller in the two component magnetic brush developing method, and the toner is charged negative through friction with the carrier.

Non-image area of the drum surface charged with negative potential repel the toner, whereas the laser exposed portions where no negative charges exist, attract the toner. As a result, a visible image appears on the drum surface.

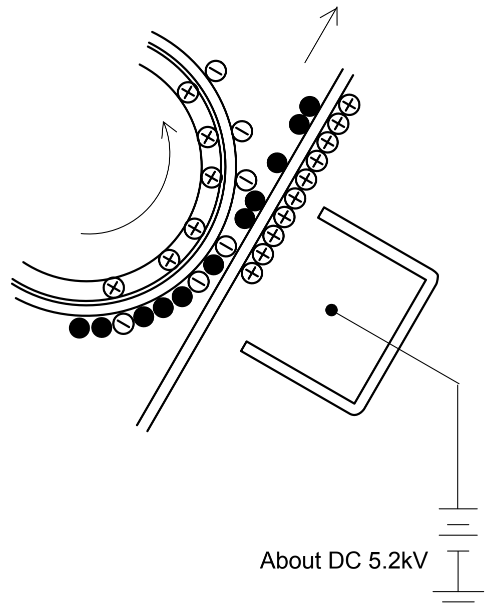




Toner is attracted over the shadowed area because of the developing bias.

Step-4: Transfer

The visible image on the drum surface is transferred onto the print paper by applying a positive charge from the transfer corona to the backside of the print paper.

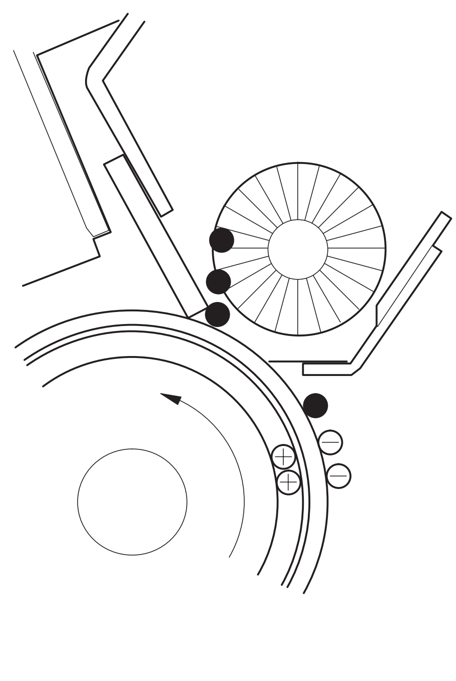


Step-5: Separation

Since the print paper is charged positively by the transfer corona, it is discharged by the separation corona. The separation corona is connected to ground.

Step-6: Cleaning

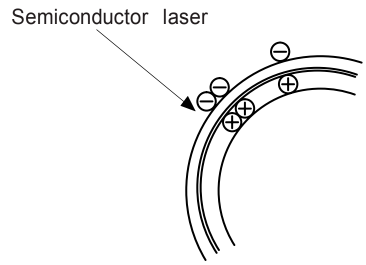
Toner remaining on the drum is removed and collected by the cleaning blade. It is transported to the waste toner collecting section in the cleaning unit by the waste toner transport roller.



Step-7: Optical discharge (Semiconductor laser)

Before the drum rotation is stopped, the semiconductor laser is radiated onto the drum to reduce the electrical resistance in the OPC layer and eliminate residual charge, providing a uniform state to the drum surface for the next page to be printed.

When the electrical resistance is reduced, positive charges on the aluminum layer are moved and neutralized with negative charges on the OPC layer.



Charge by the Scorotron charger

Function

The Scorotron charger functions to maintain uniform surface potential on the drum at all times, It control the surface potential regardless of the charge characteristics of the photoconductor.

Basic function

A screen grid is placed between the saw tooth and the photoconductor. A stable voltage is added to the screen grid to maintain the corona current on the photoconductor.

As the photoconductor is charged by the saw tooth from the main corona unit, the surface potential increases. This increases the current flowing through the screen grid. When the photoconductor potential nears the grid potential, the current turns to flow to the grid so that the photoconductor potential can be maintained at a stable level.

Process controlling

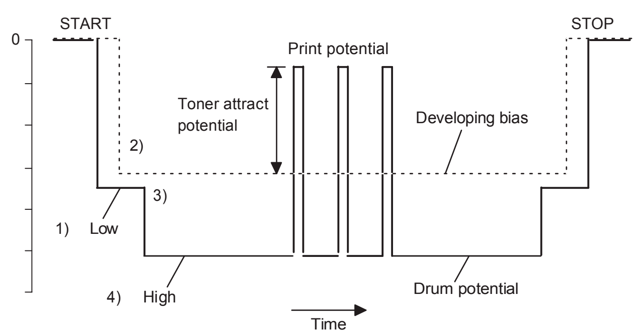
Function

The print pattern signal is converted into an invisible image by the semiconductor laser using negative to positive (reversible) developing method. Therefore, if the developing bias is added before the drum is charged, toner is attracted onto the drum. If the developing bias is not added when the drum is charged, the carrier is attracted to the drum because of the strong electrostatic force of the drum.

To avoid this, the process is controlled by adjusting the drum potential and the grid potential of the Scorotron charger.

Basic function

Voltage added to the screen grid can be selected, high and low. To make it easily understood, the figure below shows voltage transition at the developer unit.



Start

1) Because the grid potential is at a low level, the drum potential is at about -400V. (Carrier may not be attracted though the carrier is pulled towards the drum by the electrostatic force of -400V.
2) Developing bias (-400V) is applied when the photoconductor potential is switched from LOW to HIGH.
3) Once developing bias (-400V) is applied and the photo conductor potential rises to HIGH, toner will not be attracted to the drum.

Stop

The reverse sequence takes place.

Retaining developing bias at an abnormal occurrence

Function

The developing bias will be lost if the power supply was removed during print process. In this event, the drum potential slightly abates and the carrier makes deposits on the drum because of strong static power. To prevent this, the machine incorporates a function to retain the developing bias for a certain period and decrease the voltage gradually against possible power loss.

Basic function

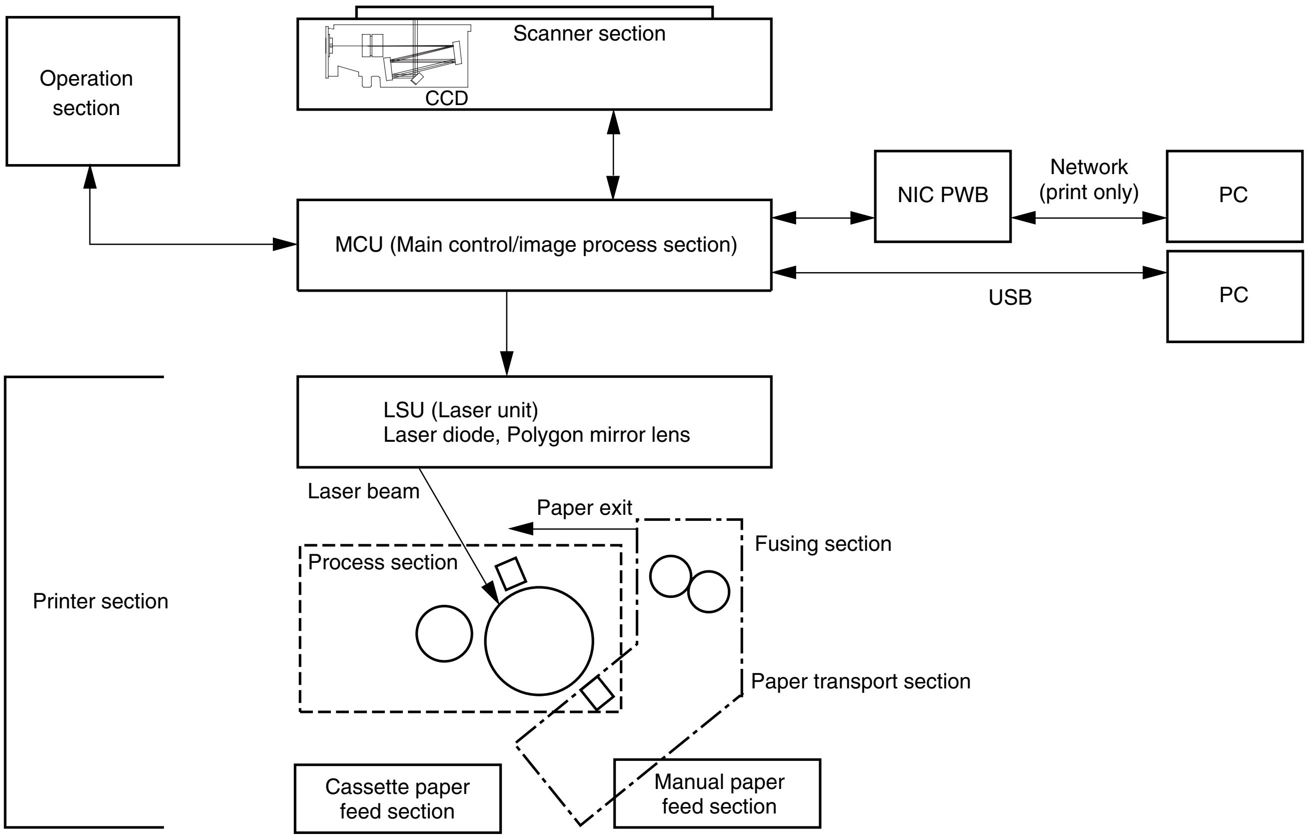
Normally, the developing bias voltage is retained for a certain time before the drum comes to a complete stop if the machine should stop before completing the normal print cycle. The developing bias can be added before resuming the operation after an abnormal interruption. Therefore, carrier will not make a deposit on the drum surface.

[7] OPERATIONAL DESCRIPTIONS

1. Outline of operation

The outline of operation is described referring to the basic configuration.

(Basic configuration)



(Outline of copy operation)

Setting conditions

1) Set copy conditions such as the copy quantity and the copy density with the operation section, and press the COPY button. The information on copy conditions is sent to the MCU.

Image scanning

2) When the COPY button is pressed, the scanner section starts scanning of images.
   The light from the copy lamp is reflected by the document and passed through the lens to the CCD.

Photo signal/Electric signal conversion

3) The image is converted into electrical signals by the CCD circuit and passed to the MCU.

Image process

4) The document image signal sent from the CCD circuit is processed under the revised conditions and sent to the LSU (laser unit) as print data.

Electric signal/Photo signal (laser beam) conversion

5) The LSU emits laser beams according to the print data. (Electrical signals are converted into photo signals.)
6) The laser beams are radiated through the polygon mirror and various lenses to the OPC drum.

Printing

7) Electrostatic latent images are formed on the OPC drum according to the laser beams, and the latent images are developed to be visible images (toner images).
8) Meanwhile the paper is fed to the image transfer section in synchronization with the image lead edge.
9) After the transfer of toner images onto the paper, the toner images are fused to the paper by the fusing section. The copied paper is discharged onto the exit tray.

(Outline of printer operation)

The print data sent from the PC are passed through the NIC PWB (in case of network connection) and the MCU to the LSU. The procedures after that are the same as above 5) and later.

(Outline of scanner operation)

The scan data are passed through the MCU to the PC according to the conditions requested by the operations with the operation panel.

2. Scanner section

A. Scanner unit

The scanner unit in the digital copier scans images.

It is composed of the optical unit and the drive unit. The optical unit performs scanning in the main scan direction with the light receiving elements (color CCD). The drive unit performs scanning in the sub scanning direction by moving the optical unit.

B. Optical system

Two white lamps are used as the light source.

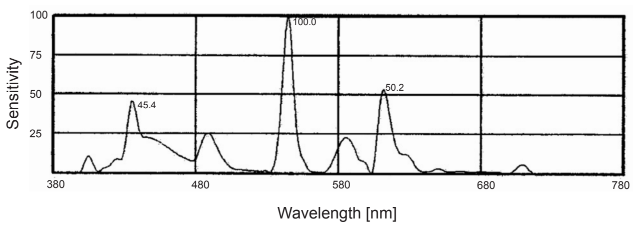
Light radiated from the light source is applied to the document on the document table. The reflected light from the document is reflected 4 times by No. 1 - No. 3 mirrors and passed through the reduction lens to form images on the light-receiving surface of 3-line CCD.

The light-receiving surface of the color CCD is provided with 3 line scanning sections for RGB. Separate images scanned in each color section are overlapped to complete color scanning. (When PC scanning)

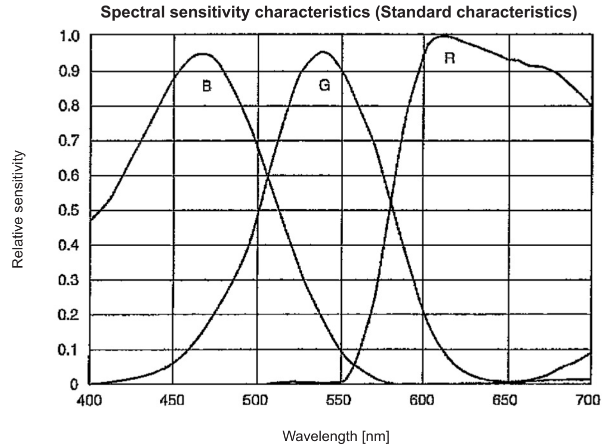
The resolution is 600dpi.

When copying, only the green component is used to print with the printer.

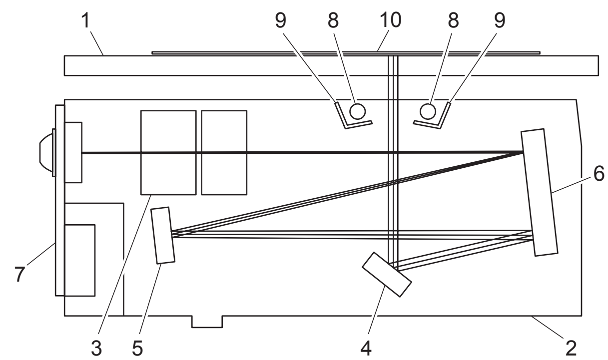
The color component for printing can be switched to red or blue by the service simulation.



(Spectrum characteristics of the lamp)



(Spectrum characteristics of the color CCD)



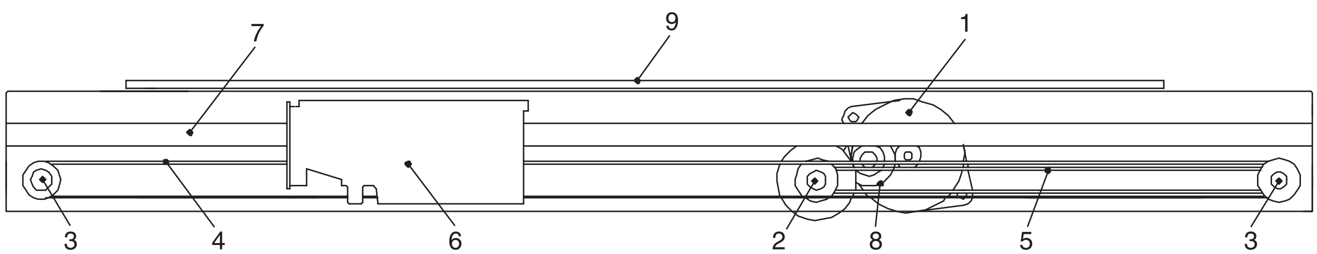
(Optical unit)

1	Table glass	2	Optical unit	3	Lens
4	Mirror 1	5	Mirror 2	6	Mirror 3
7	CCD PWB	8	Lamp	9	Reflector
10	Original				

C. Drive system

The drive system is composed of the scanner motor, the pulley gear, the idle pulley, the idle gear, the belt 473, the belt 190, and the shaft.

The motor rotation is converted into reciprocated movements of the belt 473 through the idle gear, the pulley gear, the belt 190, and the idle pulley to drive the optical unit.



1	Scanner motor	2	Pulley gear	3	Idle pulley
4	Belt 473	5	Belt 190	6	Optical unit
7	Shaft	8	Idle gear	9	Table glass

3. Laser unit

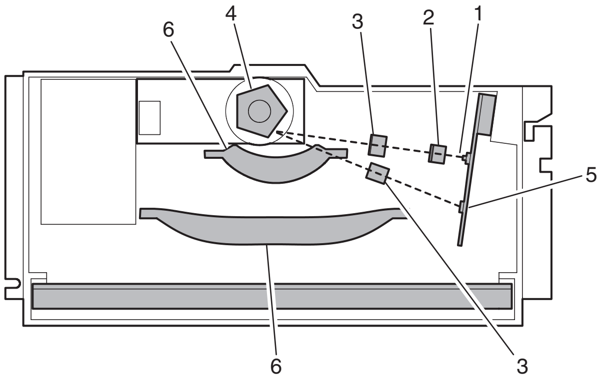
The image data sent from the MCU (image process circuit) is sent to the LSU (laser unit), where it is converted into laser beams.

A. Basic structure

The LSU unit is the writing section of the digital optical system.

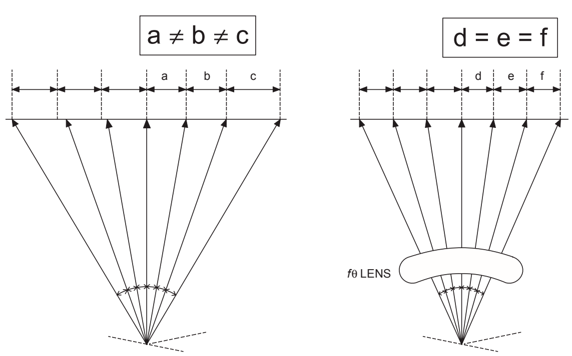
The semiconductor laser is used as the light source, and images are formed on the OPC drum by the polygon mirror and fθ lens, etc.

The laser beams are passed through the collimator lens, the cylindrical lens, the polygon mirror, the fθ lens, and the mirror to form images on the OPC drum in the main scanning direction. The laser emitting PWB is provided with the APC (auto power control) in order to eliminate fluctuations in the laser power. The BD PWB works for measurement of the laser writing start point.

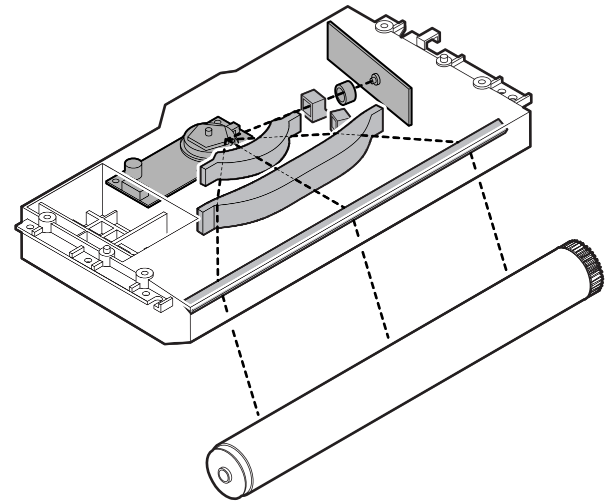


No	Component	Function
1	Semiconductor laser	Generates laser beams.
2	Collimator lens	Converges laser beams in parallel.
3	Cylinder lens	Takes the focus.
4	Polygon mirror, polygon motor	Reflects laser beams at a constant rpm.
5	BD (Lens, PWB)	Detects start timing of laser scanning.
6	fθ lens	Converges laser beams at a spot on the drum.
		Makes the laser scanning speeds at both ends of the drum same as each other. (Refer to the figure below.)

Makes the laser scanning speeds at both ends of the drum same as each other.



B. Laser beam path



C. Composition

Effective scanning width: 216mm (max.)

Resolution: 600dpi

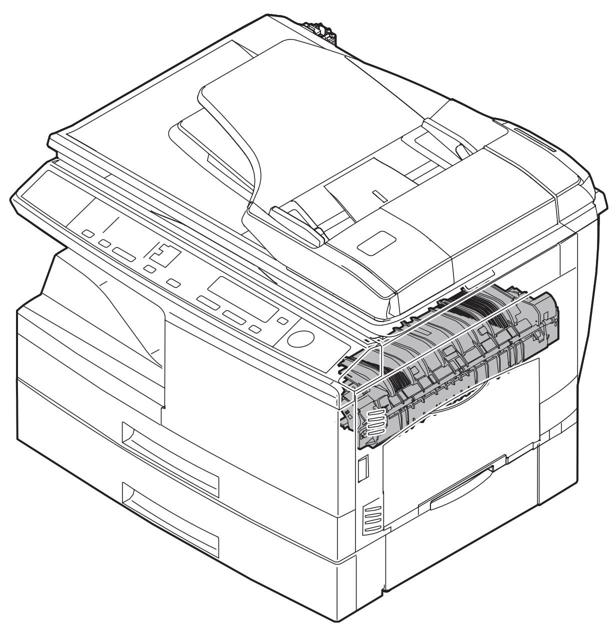
Beam diameter: 75um in the main scanning direction, 80um in the sub scanning direction

Image surface power: 0.18 ± 0.01mW (Laser wavelength 770 - 795nm)

Polygon motor section: Brushless motor 20.787rpm

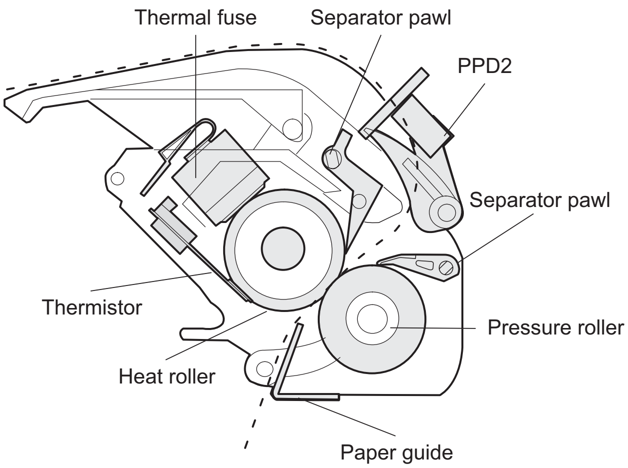
No. of mirror surfaces: 5 surfaces

4. Fuser section

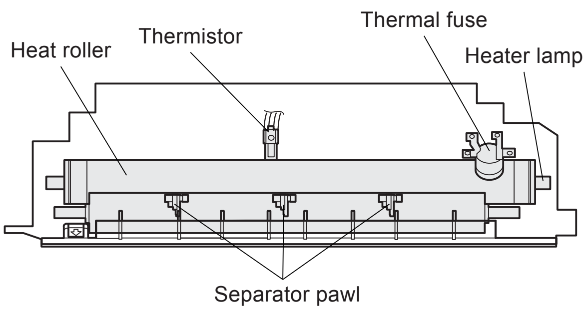


A. General description

General block diagram (cross section)



Top view



(1) Heat roller

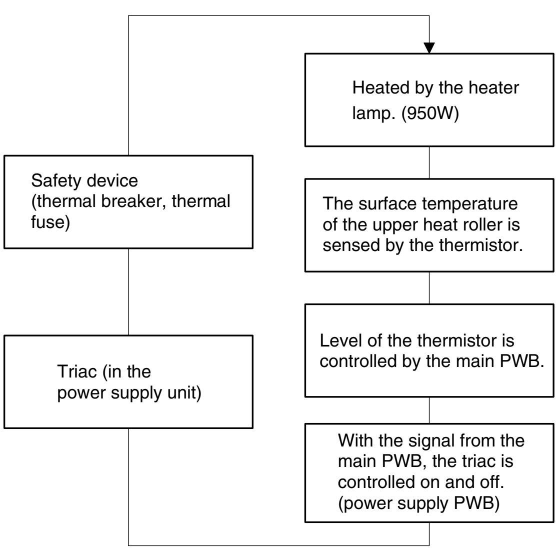
A Teflon roller is used for the heat roller and a silicone rubber roller is used for the lower heat roller for better toner fusing performance and paper separation.

(2) Separator pawl

Three separator pawls are used on the upper heat roller. The separator pawls are Teflon coated to reduce friction with the roller and prevent a smear on the paper caused by the separator pawl.

(3) Thermal control

1) The heater lamp, thermistor, main PWB, DC power supply PWB, and triac within the power supply unit are used to control the temperature in the fuser unit.
   To prevent against abnormally high temperature in the fuser unit, a thermal breaker and thermal fuse are used for safety purposes.



2) The surface temperature of the upper heat roller is set to 160 - 200°C. The surface temperature during the power save mode is set to 100°C.
3) The self-check function comes active when one of the following malfunctions occurs, and an "H" is displayed on the multi-copy window.

a. When the heat roller surface temperature rises above 240°C.
b. When the heat roller surface temperature drops below 100°C during the copy cycle.
c. Open thermistor
d. Open thermal fuse
e. When the heat roller temperature does not reach 190°C within 27 second after supplying the power.

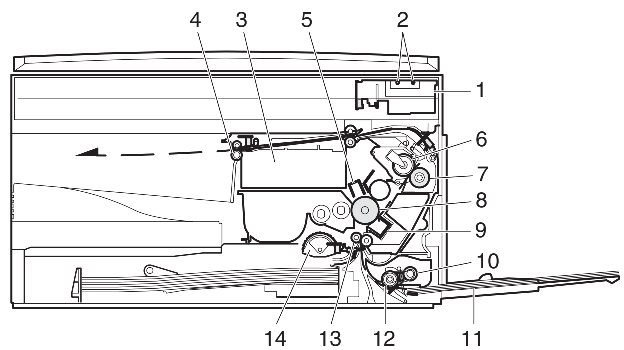
(4) Fusing resistor

This model is provided with a fusing resistor in the fusing section to improve transfer efficiency.

Since the upper heat roller is conductive, when using copy paper that contains moisture and the distance between the transfer unit and the fusing unit is short, the transfer current may find a path to ground via the copy paper, the upper heat roller and the discharging brush.

5. Paper feed section and paper transport section

A. Paper transport path and general operations



1	Scanner unit	8	Drum
2	Copy lamp	9	Transfer unit
3	LSU (Laser unit)	10	Pickup roller
4	Paper exit roller	11	Manual paper feed tray
5	Main charger	12	Manual paper feed roller
6	Heat roller	13	PS roller unit
7	Pressure roller	14	Paper feed roller

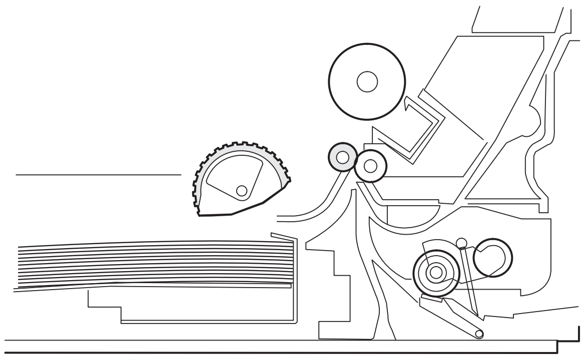
Paper feed is made in two ways; the tray paper feed and the manual paper feed. The tray is of universal-type, and has the capacity of 250 sheets.

The front loading system allows you to install or remove the tray from the front cabinet.

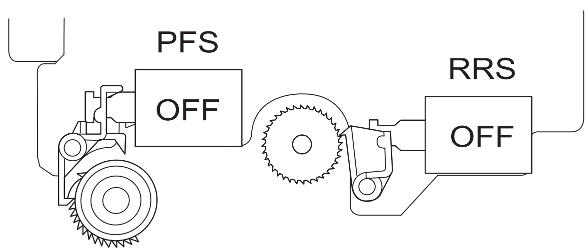
The general descriptions on the tray paper feed and the manual paper feed operation are given below.

(1) Cassette paper feed operation

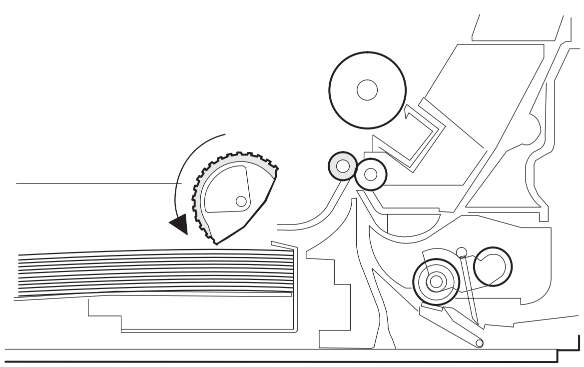
1) The figure below shows the positions of the pick-up roller, the paper feed clutch sleeve, and the paper feed latch in the initial state without pressing the COPY button after lighting the ready lamp.
   The paper feed latch is in contact with the projection of the clutch sleeve.

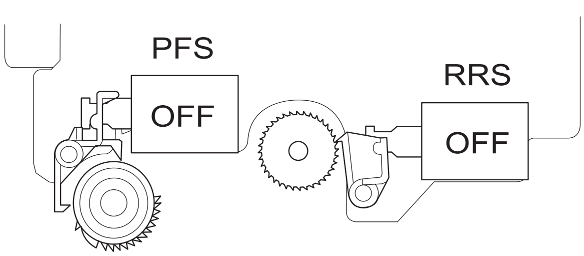


2) When the COPY button is pressed, the main drive motor starts rotating to drive each drive gear.
   The pick-up drive gear also is driven at that time. Since, however, the paper feed latch is in contact with the projection of the clutch sleeve, rotation of the drive gear is not transmitted to the pick-up roller, which does not rotate therefore.



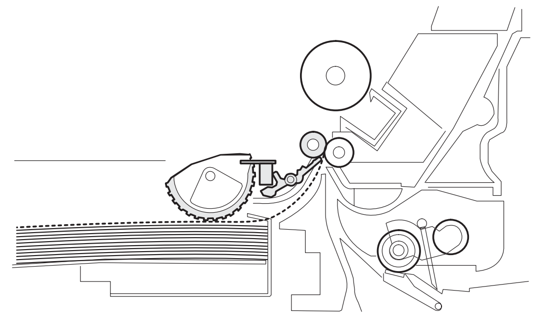
3) After about 0.1 sec from when the main motor start rotating, the tray paper feed solenoid (PFS) turns on for a moment.
   This disengages the paper feed latch from the projection of the clutch sleeve, transmitting rotation of the pick-up drive gear to the paper feed roller shaft, rotating the pick-up roller to feed the paper.

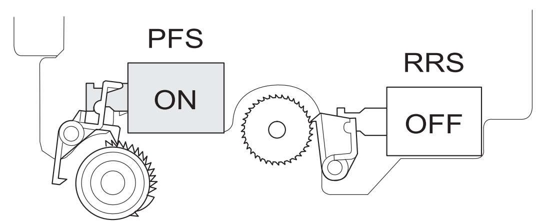




4) After more than half rotation of the pick-up roller, the paper feed latch is brought in contact with a notch on the clutch sleeve, stopping rotation of the pick-up roller.

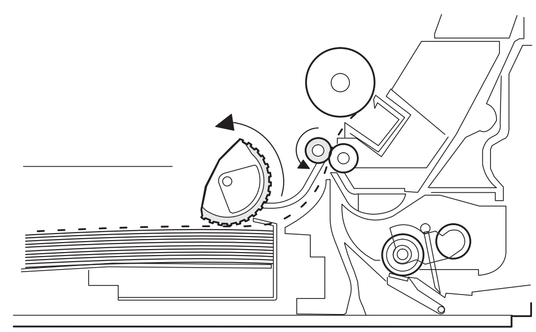
5) At this time, the paper is fed passed the paper entry detection switch (PPD1), and detected by it. After about 0.15 sec from detection of paper by PPD1, the tray paper feed solenoid (PFS) turns on so that the clutch sleeve projection comes into contact with the paper feed latch to stop the pick-up roller. Then the pick-up roller rotates for about 0.15 sec so that the lead edge of the paper is evenly pressed on the resist roller, preventing against skew feeding.

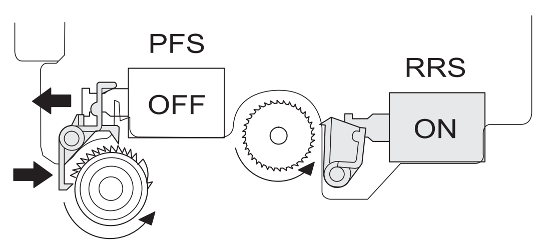




6) To release the resist roller, the tray paper feed solenoid and the resist solenoid are turned on by the paper start signal to disengage the resist start latch from the clutch sleeve, transmitting rotation of the resist drive gear to the resist roller shaft. Thus the paper is transported by the resist roller.

7) After the resist roller starts rotating, the paper is passed through the pre-transfer guide to the transfer section. Images are transferred on the paper, which is separated from the OPC drum by the drum curve and the separation section.

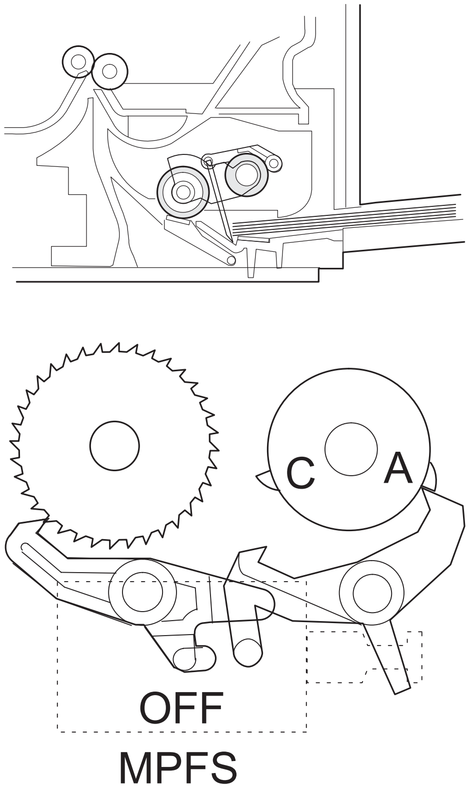




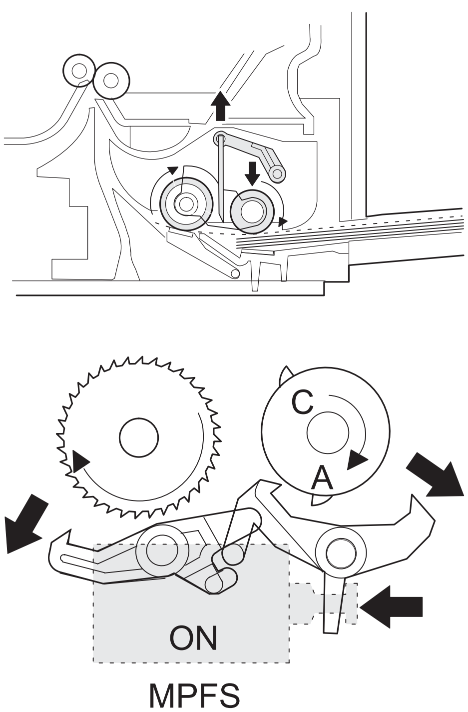
8) The paper separated from the drum is passed through the fusing paper guide, the heat roller (fusing section), POD (paper out detector) to the copy tray.

(2) Manual multi paper feed operation

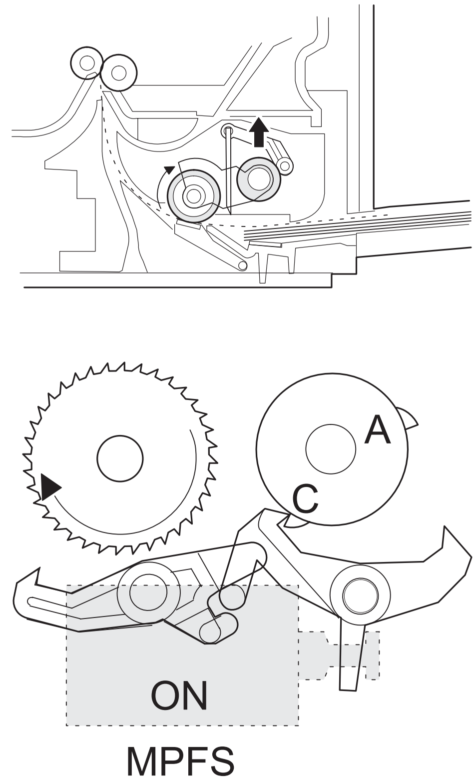
1) Before paper feed operation, the manual paper feed solenoid (MPFS) is turned OFF as shown in the figure below.



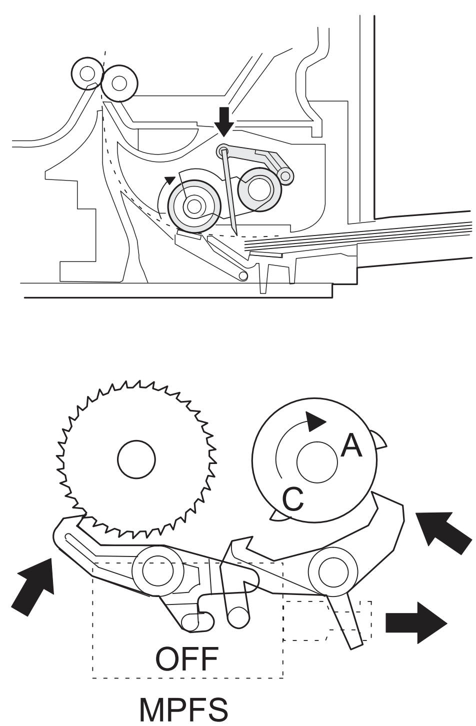
2) When the PRINT button is pressed, the manual paper feed solenoid (MPFS) turns on to disengage the manual paper feed latch.
   A from the manual paper feed clutch sleeve A, rotating the manual paper feed roller and the manual take-up roller. At the same time, the manual paper feed stopper opens and the manual take-up roller is pressed to the surface of the paper to start paper feeding.



3) When pawl C of the manual paper feed clutch sleeve is engaged with the manual feed latch, the manual feed stopper falls and the manual take-up roller rises. At that time, the manual paper feed roller is rotating.



4) The lead edge of the transported paper is pressed on the resist roller by the transport roller. Then the paper is stopped temporarily to allow synchronization with the lead edge of the image on the OPC drum.
   From this point, the operation is the same as the paper feed operation from the tray. (Refer to 7-5 - 8.)
5) The solenoid turns off to close the gate and return to the initial state.



(3) Conditions of occurrence of paper misfeed

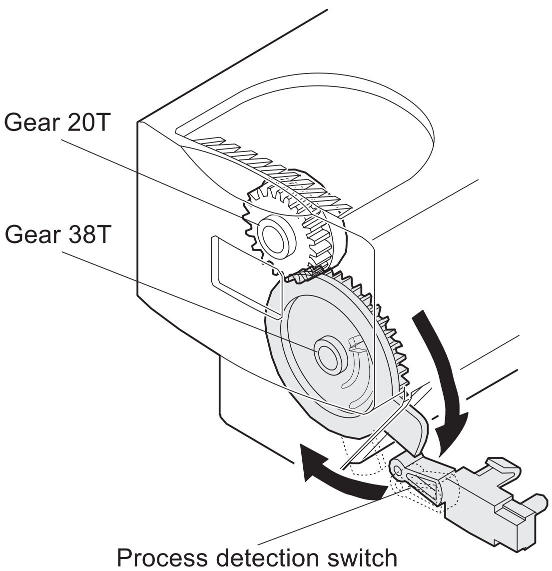
a. When the power is turned on:
PPD or POD is ON when the power is turned on.

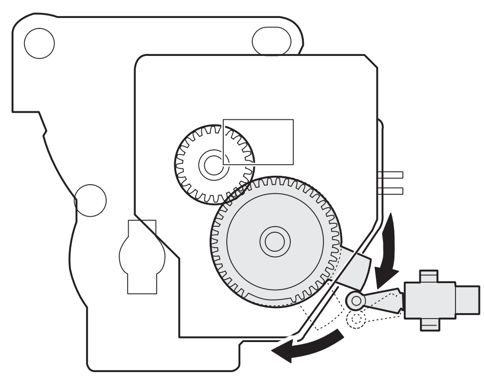
b. Copy operation

a	PPD1 jam	PPD1 does not turn off within 4 sec after turning on the resist roller.
b	PPD2 jam	PPD2 is off immediately after turning on the resist roller.
		PPD2 does not turn off within 1.2 sec after turning off the resist roller.
c	POD jam	POD does not turn on within 2.9 sec after turning on the resist roller.
		POD does not turn off within 1.5 sec - 2.7 sec after turning off PPD2.

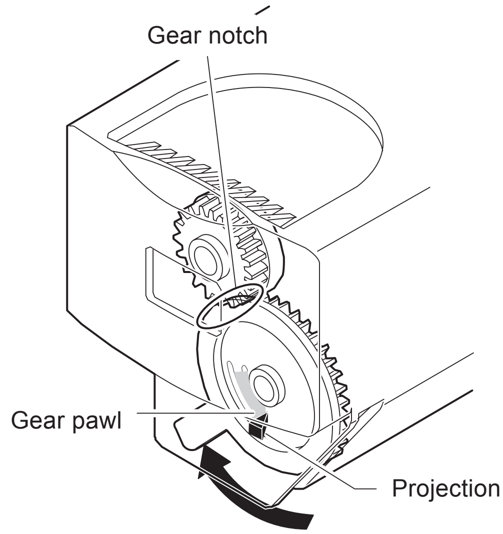
6. Process unit new drum detection mechanism

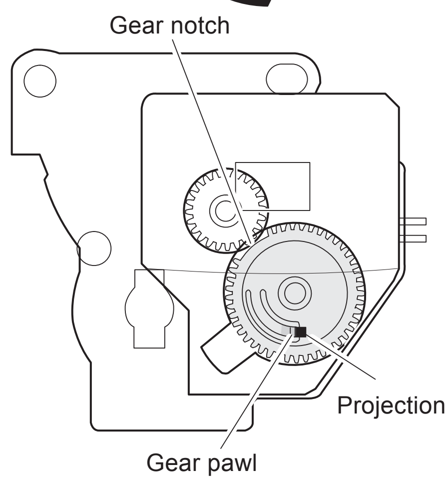
1) When the power is turned on, the detection gear 38T is rotated in the arrow direction by the detection gear 20T to push the micro-switch (process detection switch) installed to the machine sensor cover, making a judgement as a new drum.





2) When the detection gear 38T turns one rotation, there is no gear any more and it stops.
The latch section of the 38T gear is latched and fixed with the projection of the process cover.



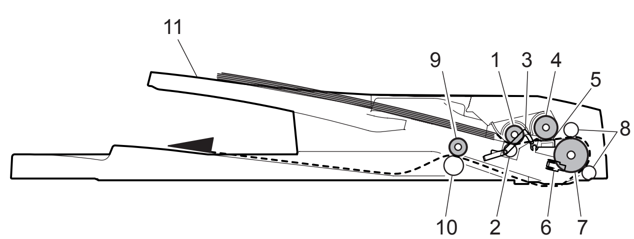


7. SPF section

A. Outline

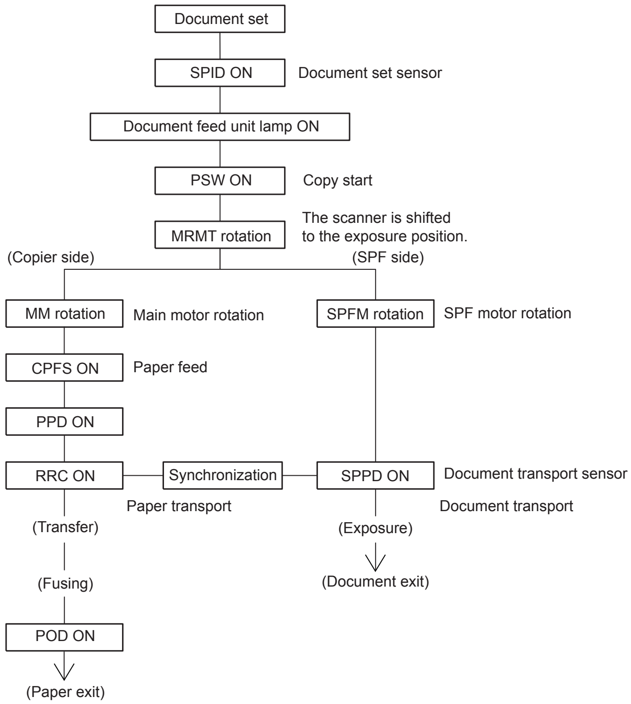
The SPF (Single Path Feeder) is installed to the AL-2030/2040CS as a standard provision, and it automatically copies up to 50 sheets of documents of a same size. (Only one set of copies)

B. Document transport path and basic composition

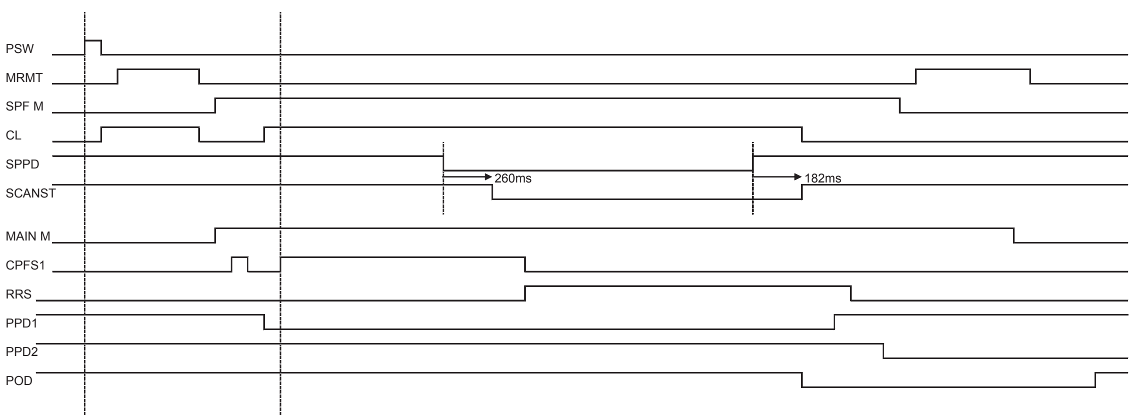


1	Pickup roller	2	Sheet of document for paper feed
3	Set detection ACT	4	Document feed roller
5	Separation sheet	6	Paper entry sensor
7	PS roller D	8	Transport follower roller
9	Paper exit roller	10	Paper exit follower roller
11	Document tray		

C. Operational descriptions



In the zooming mode, the magnification ratio in the sub scanning direction (paper transport direction) is adjusted by changing the document transport speed.

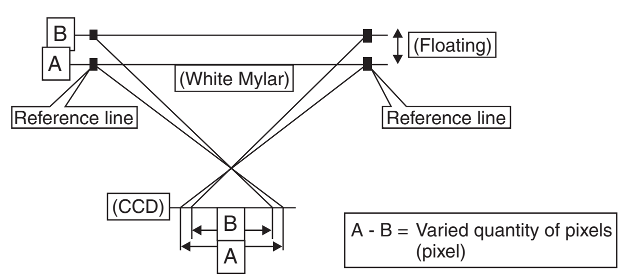


SPF JAM generation condition

1) When SPPD is ON (document remaining) in initializing
2) When SPPD is not turned ON within about 1.5 sec (at 100% copy) after starting the document feed operation.
3) When SPPD is not turned OFF within about 4.7 sec (at 100% copy) after turning on SPPD.
4) When the OC cover is opened during document transport (during SPF motor rotation) (The SPF motor is stopped during document transport, but the OC cover open error occurs instead of the SPF JAM.)

D. SPF open/close detection (book document detection)

SPF open/close detection (book document) detection is performed by detecting the interval between the reference lines on the white Mylar attached to the paper exit guide (document scanning section) by the scanner (CCD) and detecting the varied quantity.



[8] DISASSEMBLY AND ASSEMBLY

Before disassembly, be sure to disconnect the power cord for safety.

1. **Do not disconnect or connect the connector and the harness while the machine is powered. Especially be careful not to disconnect or connect the harness between the MCU PWB and the LSU (MCU PWB: CN42) during the machine is powered. (If it is disconnected or connected during the machine is powered, the IC inside the LSU will be destroyed.)**
2. **To disconnect the harness after turning on the power, be sure to turn off the power and wait for at least 10 sec before disconnection. (Note that a voltage still remains immediately after turning off the power.)**

The disassembly and assembly procedures are described for the following sections:

1. High voltage section
2. Operation panel section
3. Optical section
4. Fusing section
5. Tray paper feed/transport section
6. Manual paper feed section
7. Rear frame section
8. Power section
9. SPF section
10. 2nd cassette section

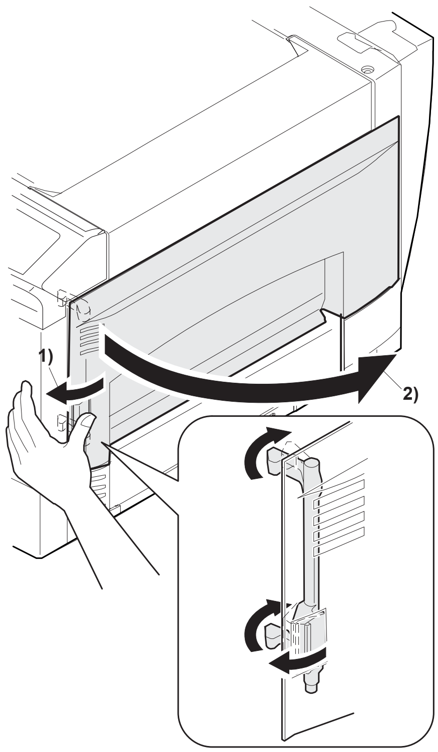
1. High voltage section

A. List

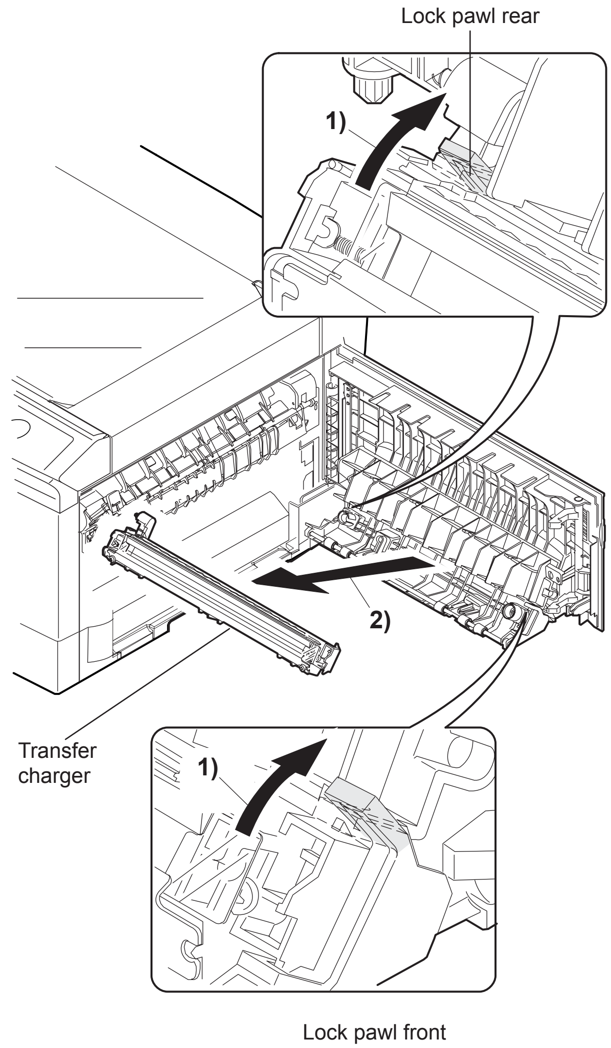
No.	Part name Ref.
1	Transfer charger unit
2	Charger wire

B. Disassembly procedure

1) Press the side cover open/close button and open the side cover.



2) Push up the lock pawls (2 positions) of the side cover, and remove the transfer charger.

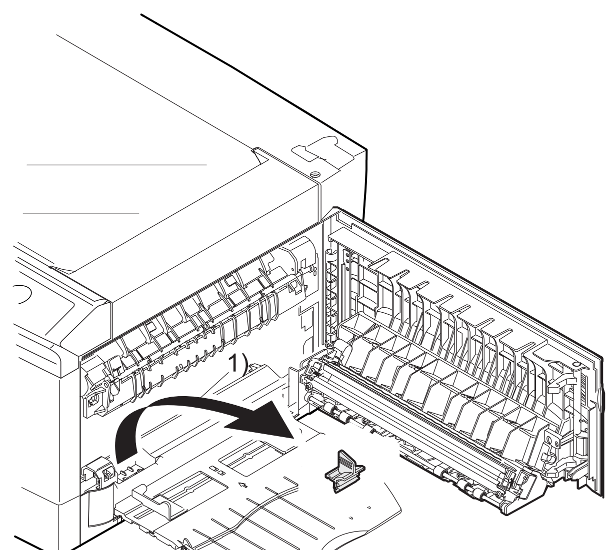


C. Assembly procedure

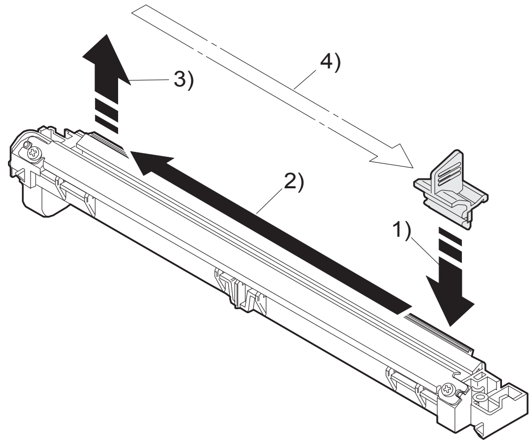
For assembly, reverse the disassembly procedure.

D. Charger wire cleaning

1) Remove the charger cleaner from the manual paper feed unit.



2) Set the charger cleaner to the transfer unit, and move it reciprocally a few times in the direction of the arrow shown in the figure below.



E. Charger wire replacement

1) Remove the TC cover and remove the screw.
2) Remove the spring and remove the charger wire.
3) Install a new charger wire by reversing the procedures (1) and (2).
   At that time, be careful of the following items.

- The rest of the charger wire must be within 1.5mm. Refer to Fig.1
- The spring hook section (charger wire winding section) must be in the range of the projection section.
- Be careful not to twist the charger wire.

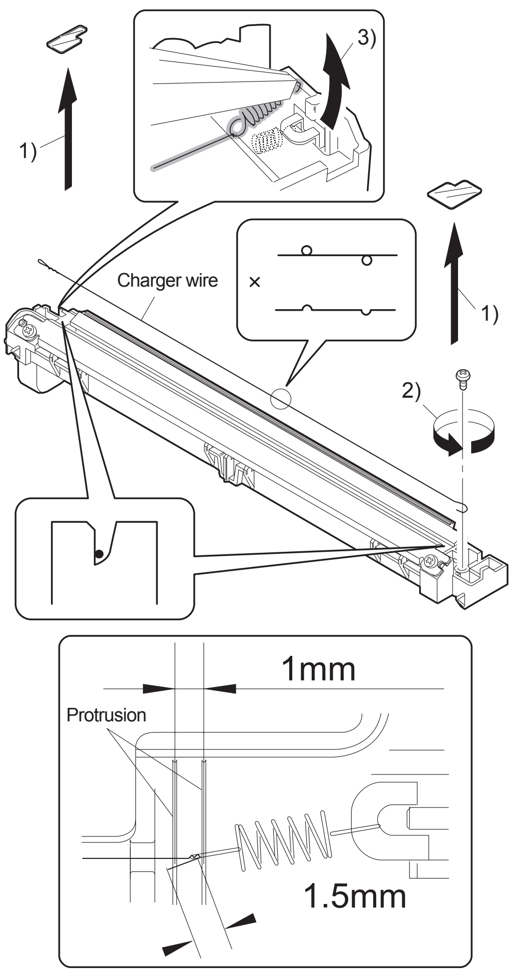


Fig.1

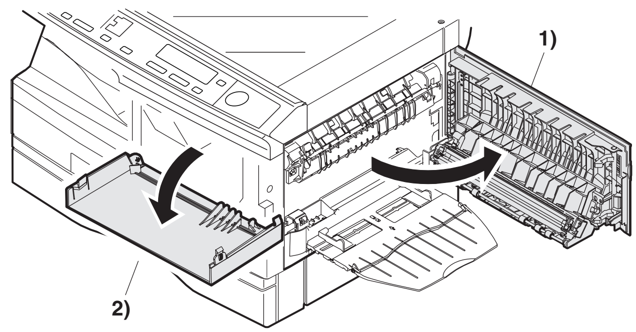
2. Operation panel section

A. List

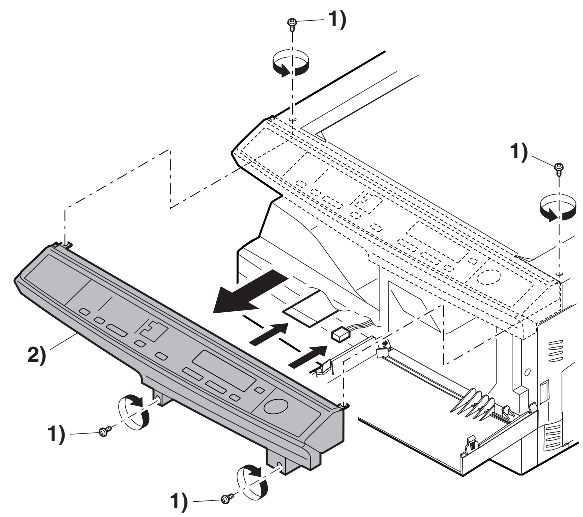
No.	Part name Ref.
1	Operation panel unit
2	Operation PWB

B. Disassembly procedure

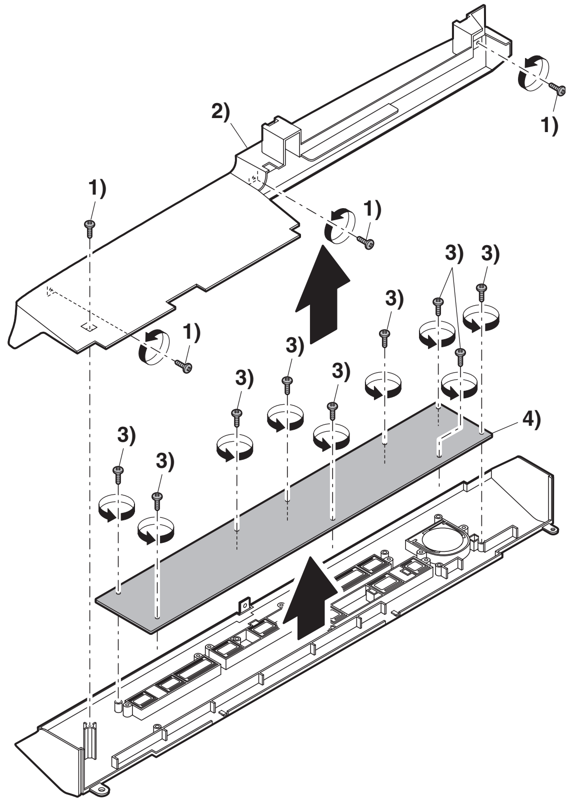
1) Open the side door, and Open the front cover.



2) Remove the screws (4 pcs.), the harness, and the operation panel unit.



3) Remove four screws, and remove the operation cabinet.
4) Remove four screws, and remove the operation PWB.



C. Assembly procedure

For assembly, reverse the disassembly procedure

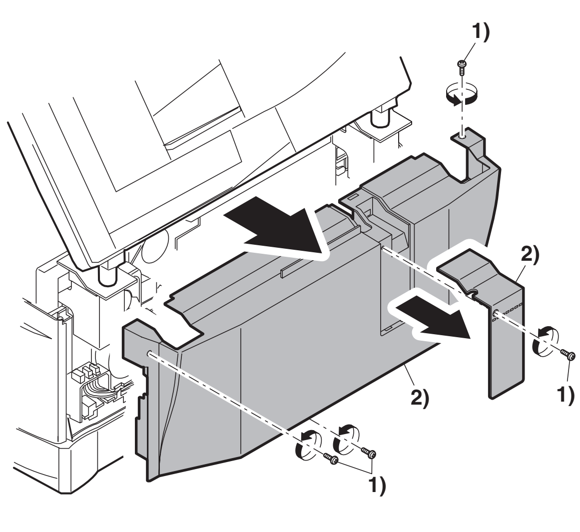
3. Optical section

A. List

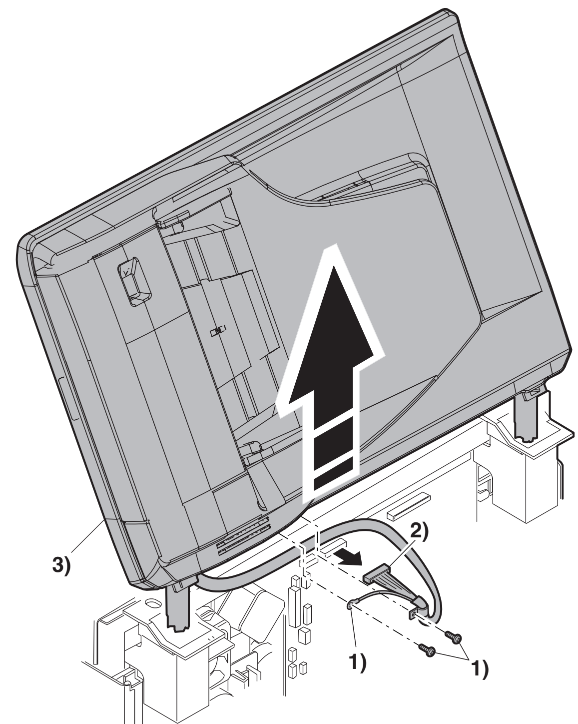
NO.	Part name Ref.
1	Copy lamp unit
2	Copy lamp
3	Lens unit

B. Disassembly procedure

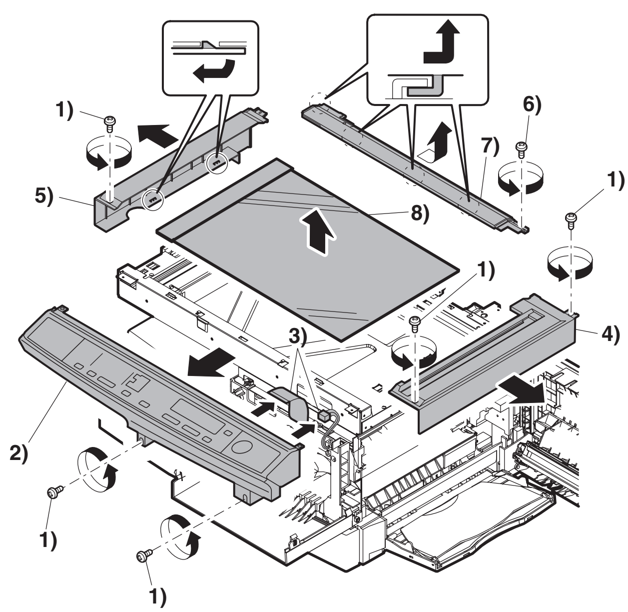
1) Remove four screws, and remove the rear cabinet and the rear cabinet cover.



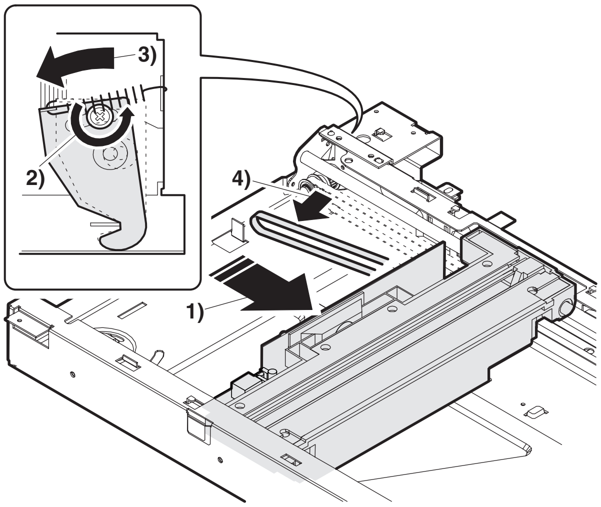
2) Remove two screws, and remove the earth wire.
3) Disconnect the connector.
4) Remove the SPF unit.



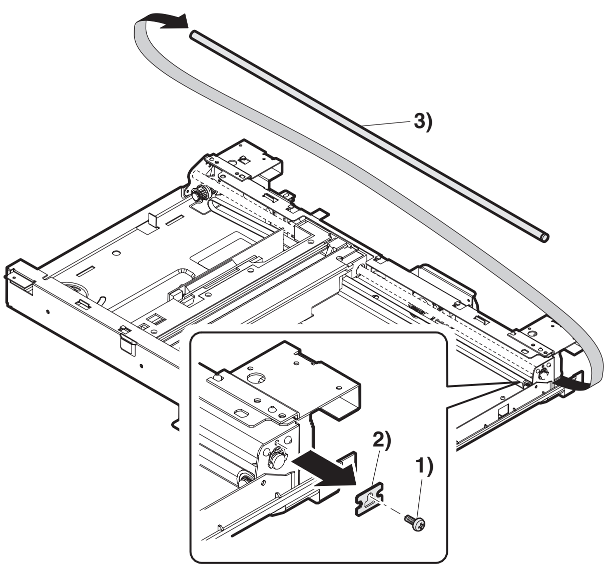
5) Remove five screws. Remove the operation unit, and disconnect the connector.
6) Remove the right cabinet.
7) Remove the left cabinet.
8) Remove the screw, and remove the rear cover.
9) Remove the table glass.



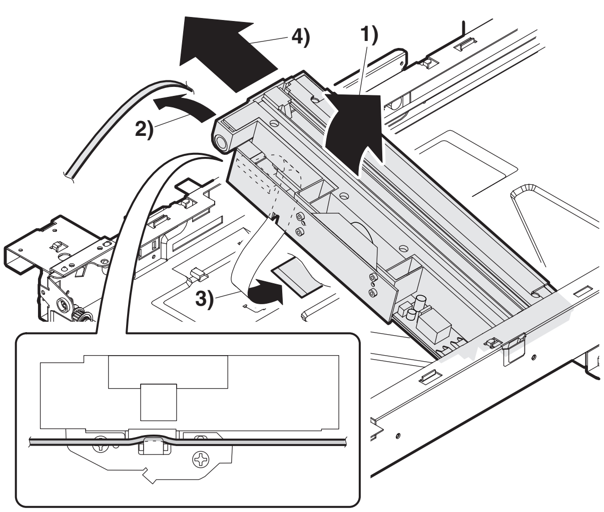
10) Move the carriage to the position indicated on the figure.
11) Loosen the screw which is fixing the tension plate.
12) Move the tension plate in the arrow direction to release the tension, and remove the belt.



13) Remove the screw, and remove the rod stopper.
14) Remove the rod.



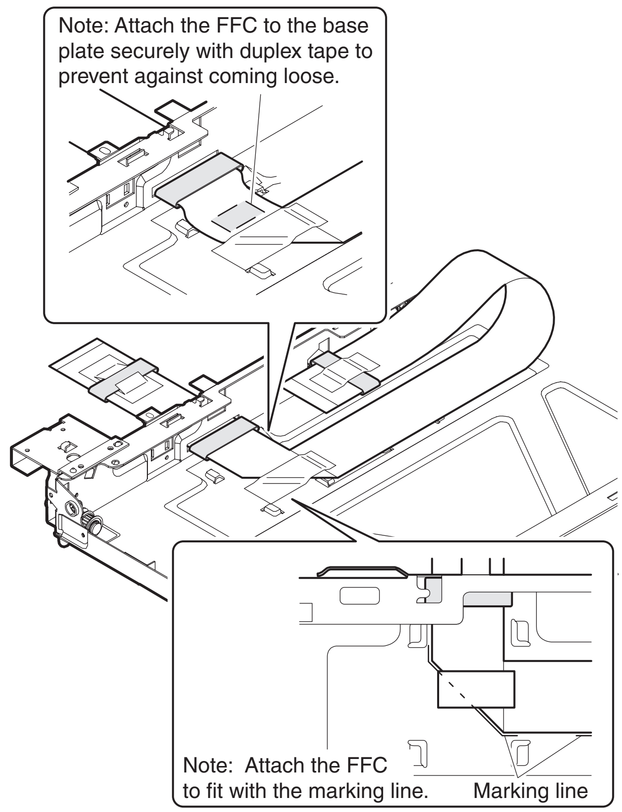
15) Lift the rear side of the carriage, remove the belt and the connector, and remove the carriage.

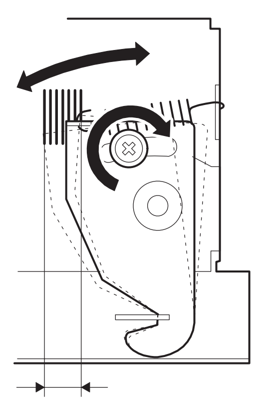


C. Assembly procedure

CCD core

1) Pass the core through the CCD-MCU harness.
2) Insert the CCD-MCU harness into the CCD PWB connector of the carriage unit.
3) Move the core which was passed through the CCD-MCU harness near the CCD PWB connector as shown in the figure below, and fix it with a filament tape (19mm wide, 40mm long). For the attachment reference, refer to the figure below. Clean and remove oil from the attachment section.
4) Attach the CCD-MCU harness to the duplex tape on the back of the carriage unit.
5) Attach the PWB holder to the position specified in the figure below.
6) Pass the core through the FFC and the PWB holder, and fix the core.





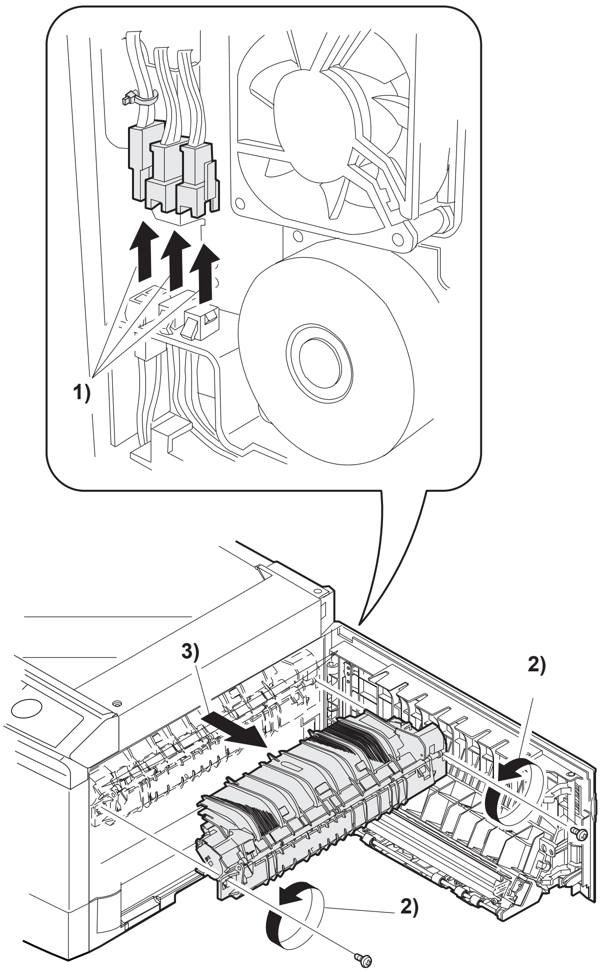
4. Fusing section

A. List

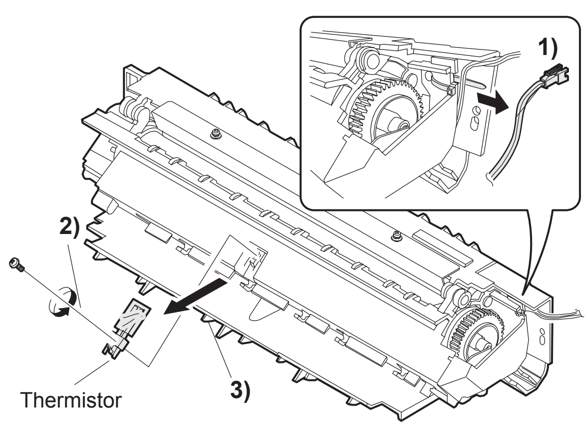
No.	Part name Ref.
1	Thermistor
2	PPD2 sensor
3	Heater lamp
4	Pressure roller
5	Heat roller

B. Disassembly procedure

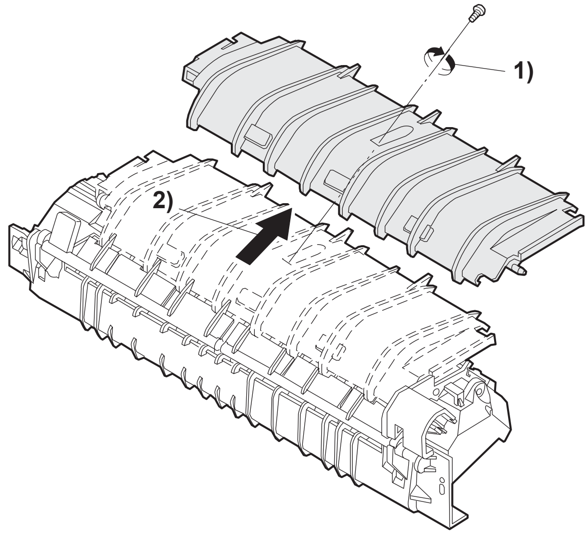
1) Remove the connectors (3 pcs.) of the rear cabinet.
2) Open the side cover, remove two screws, and remove the fusing unit.



3) Cut the binding band, remove the screw, and remove the thermistor.

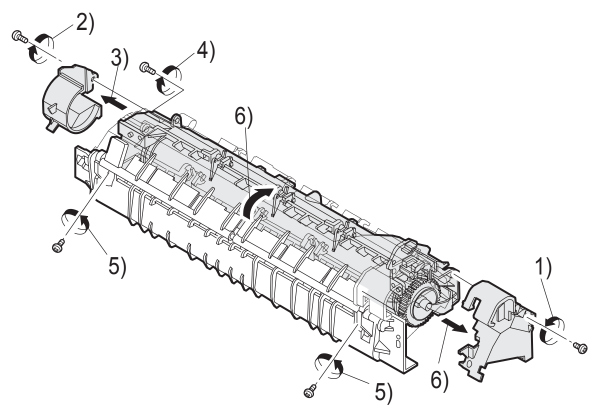


4) Remove the screw and remove the U-turn guide.

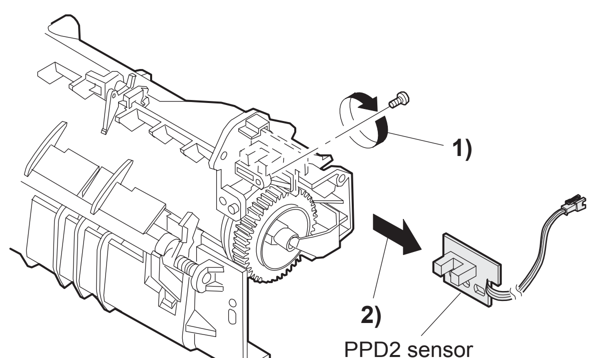


Pressure roller section disassembly

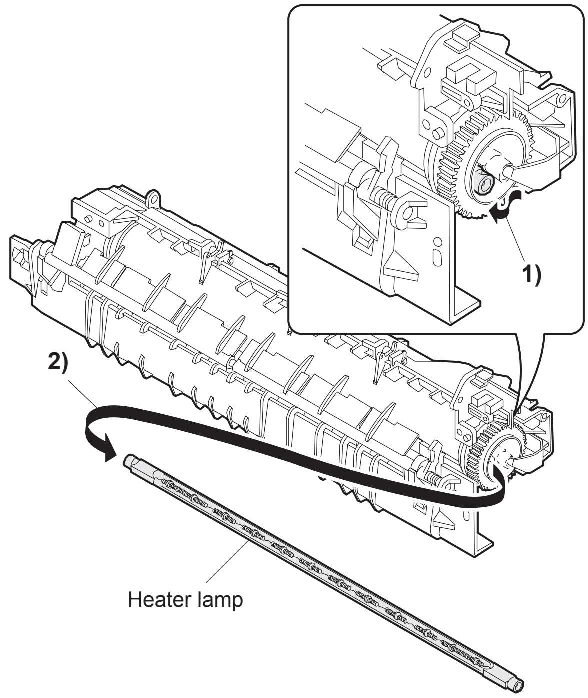
5) Remove the three screws, remove the fusing cover lower on the right side, and open the heat roller section.



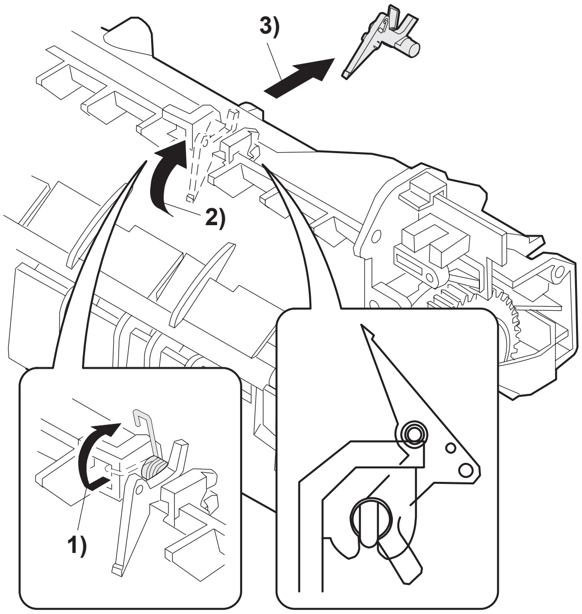
6) Remove the screw and remove the PPD2 sensor.



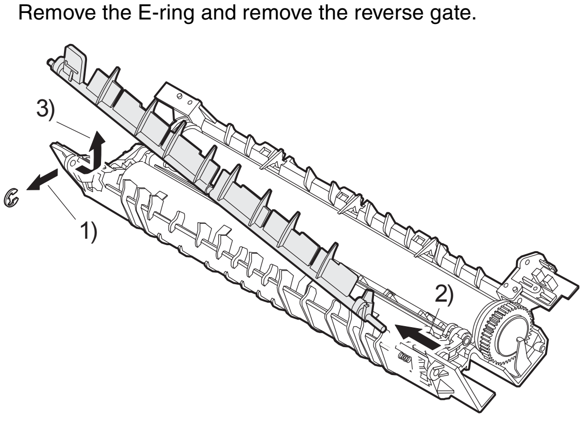
7) Remove the plate spring on the right and remove the heater lamp.



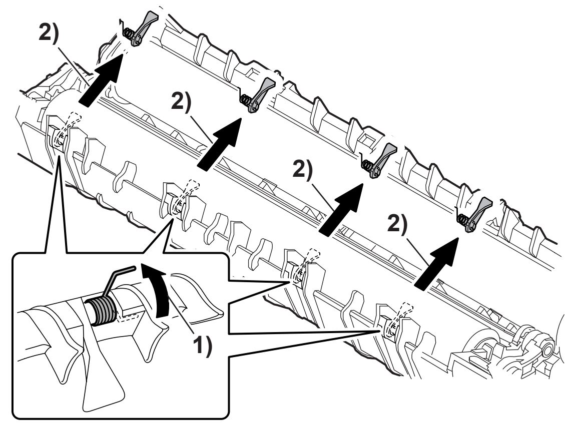
8) Remove the spring, and remove the upper separation pawls (3 pcs.).



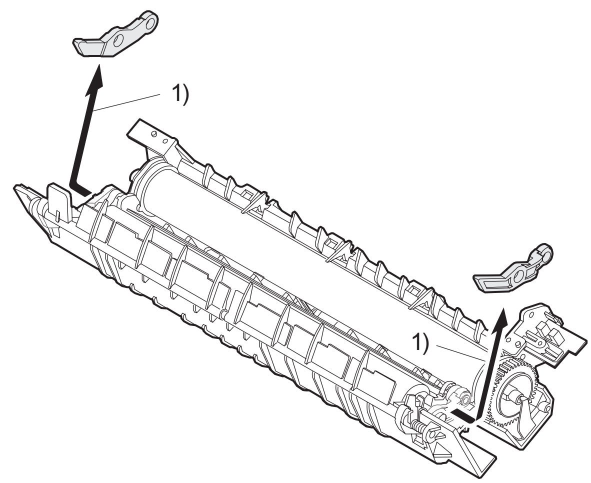
9) Remove the E-ring and remove the reverse gate.



10) Remove the spring, and remove the lower separation pawls (4 pcs.).

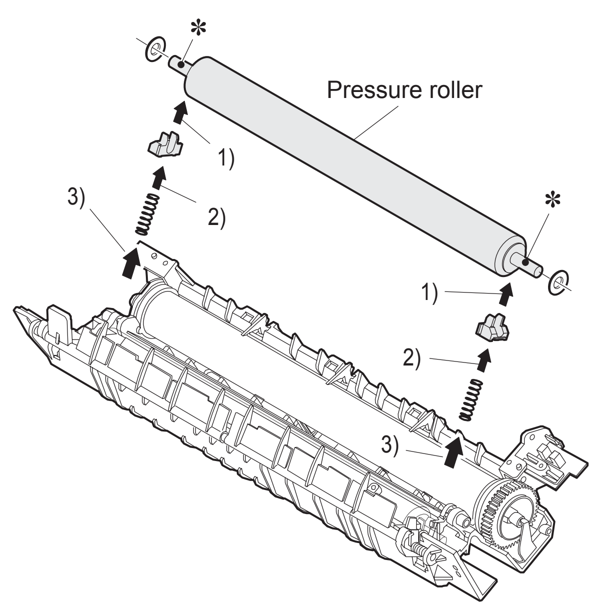


11) Remove the pressure release levers on the right and the left sides.



12) Remove the pressure roller, the pressure bearing, and the spring.

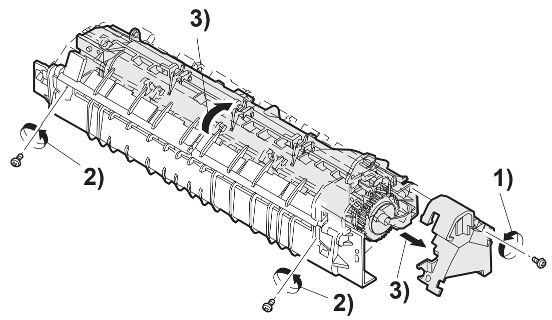
Note: Apply grease to the sections specified with an asterisk (*).



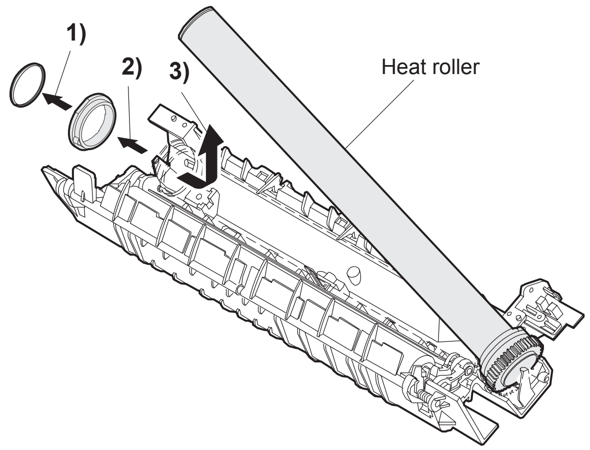
Heat roller disassembly

(Continued from procedure (4).)

5) Remove screws, remove the fusing cover, and open the heat roller section.

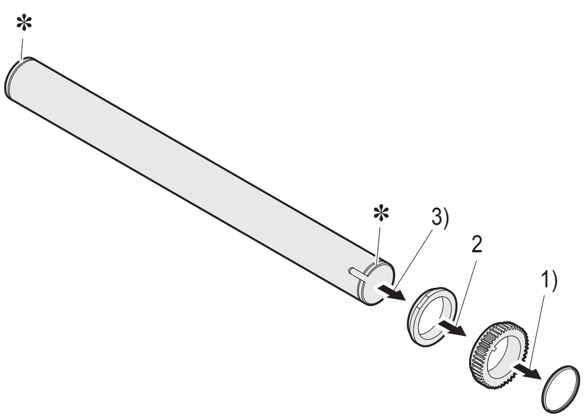


6) Remove the C-ring and the fusing bearing, and remove the heat roller.



7) Remove the parts from the heat roller.

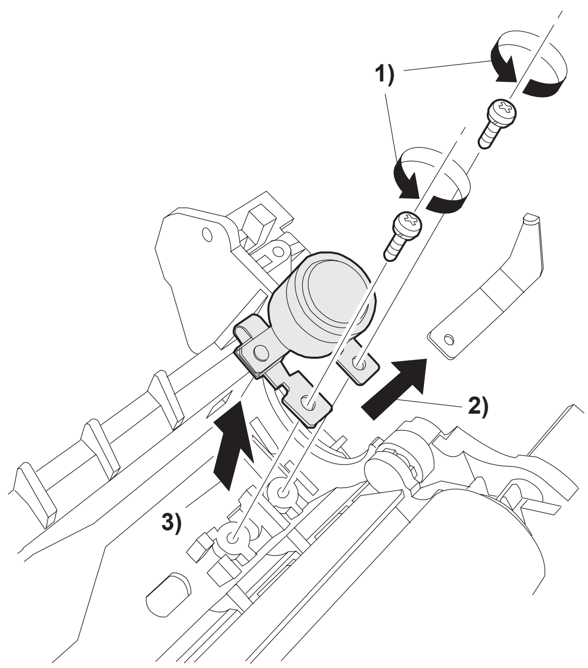
Note: Apply grease to the sections specified with ∗.



8) Remove two screws and remove the thermo unit.

Note: The set temperature of the thermostat differs from that of the current model.

	Temperature
Current model	210°C
AL-2030/2040CS	230°C



C. Assembly procedure

For assembly, reverse the disassembly procedure.

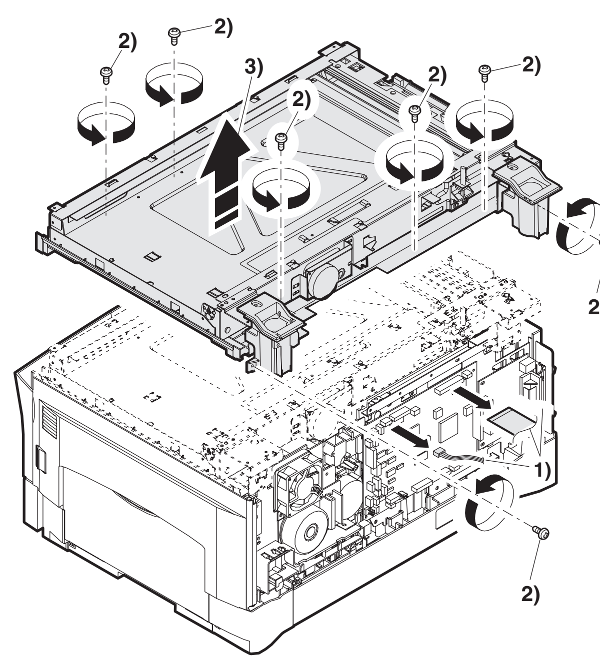
5. Tray paper feed/transport section

A. List

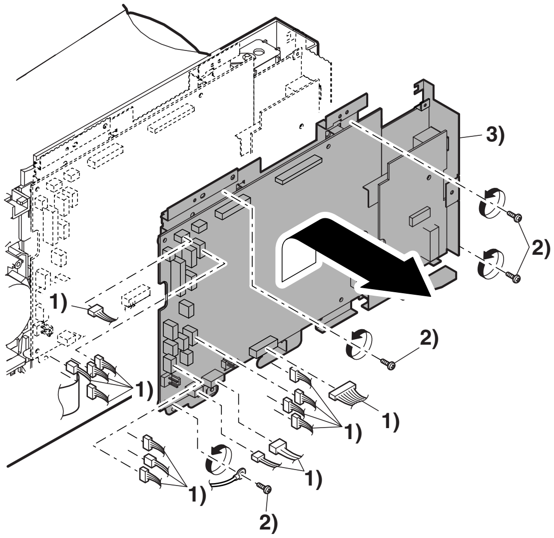
No.	Part name Ref.
1	PPD1 sensor PWB
2	LSU unit
3	Intermediate frame unit
4	Paper feed roller

B. Disassembly procedure

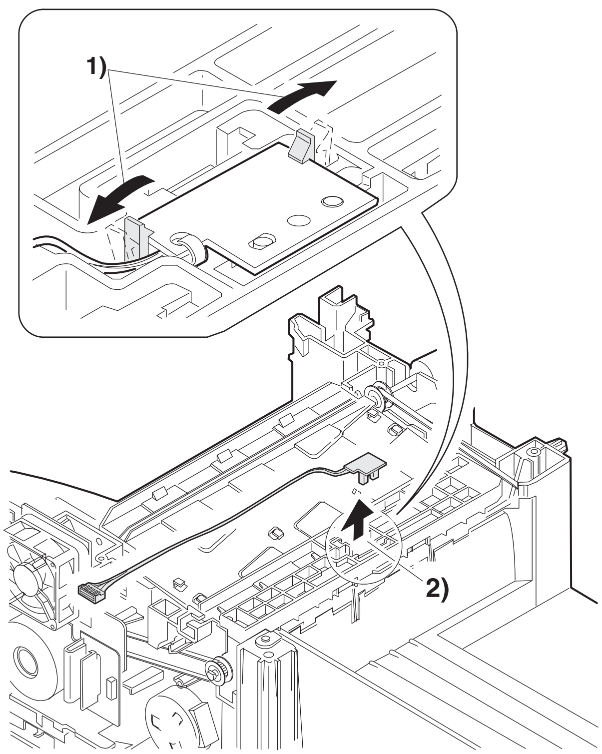
1) Remove two screws, and remove the hinge guide R.
2) Disconnect the connector. (2 positions)
3) Remove five screws, and remove the scanner unit.
4) Remove the fan duct.



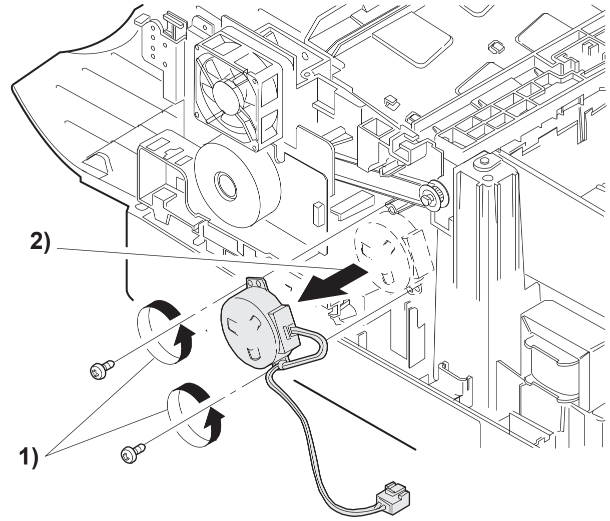
5) Remove each connector and four screws, and remove the MCU PWB.



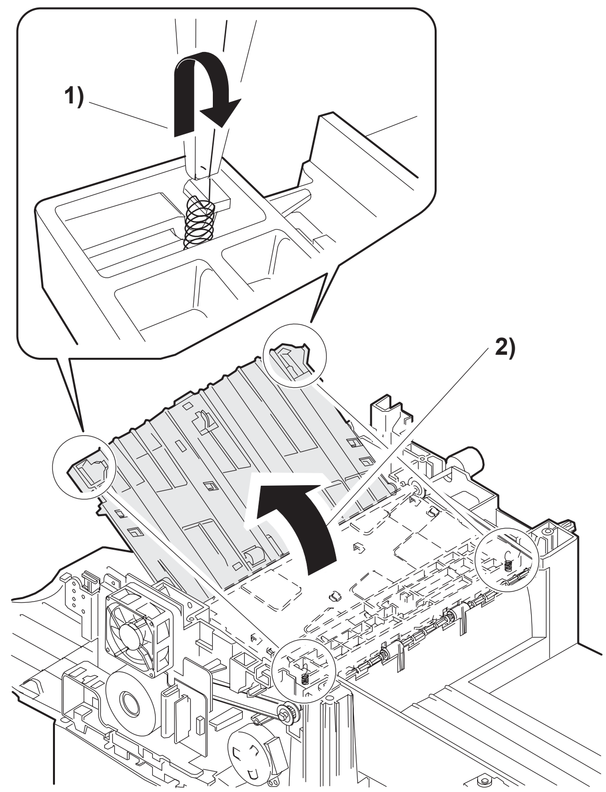
6) Remove the PWB insulation mylar and remove the paper transport detection sensor (PPD2).



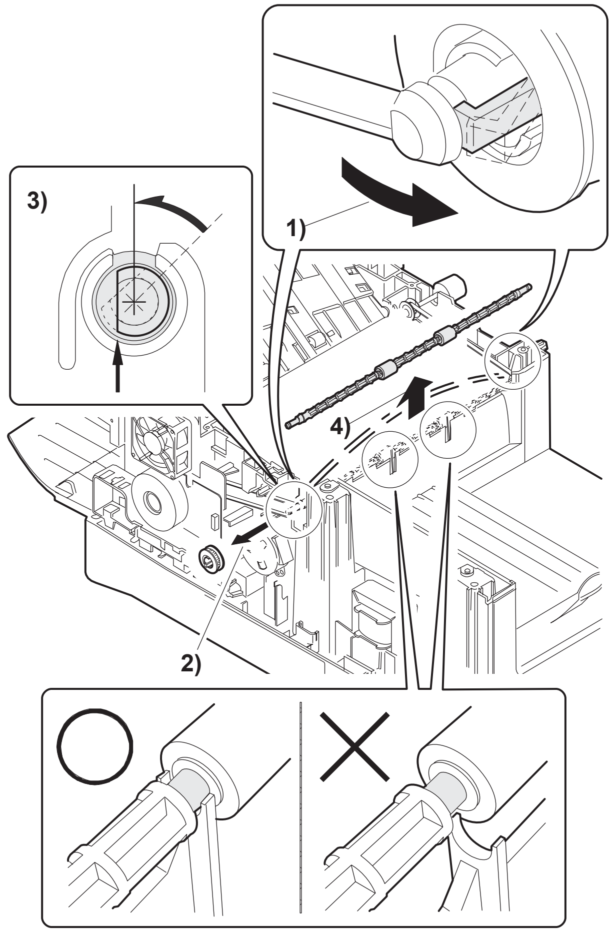
7) Remove two screws and remove the toner motor.



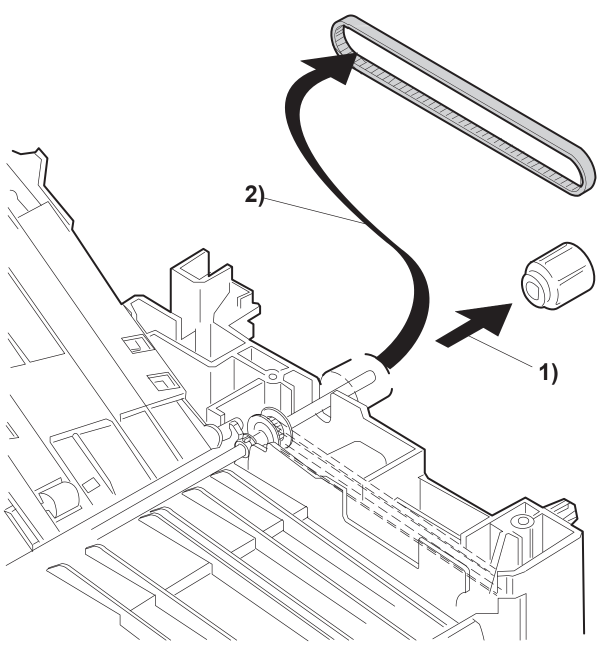
8) Remove two springs and open the intermediate frame unit.



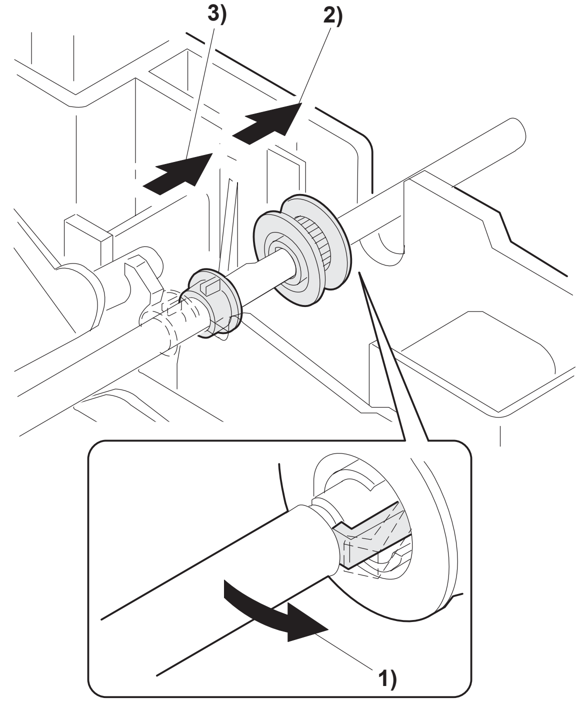
9) Remove the pulleys on the both sides and remove the paper exit roller.



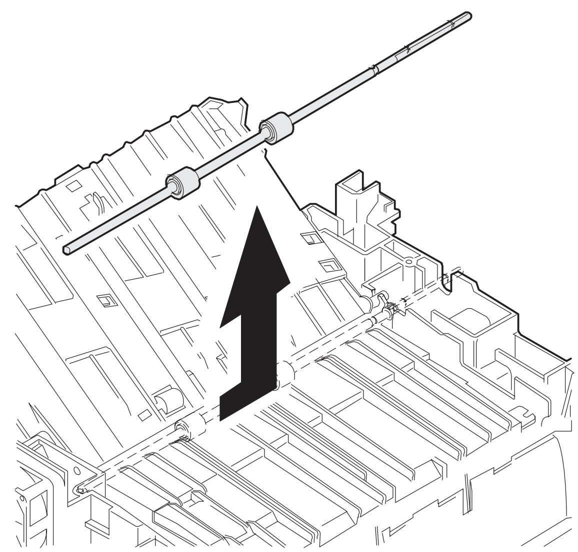
10) Pull out the paper exit roller knob and remove the belt.



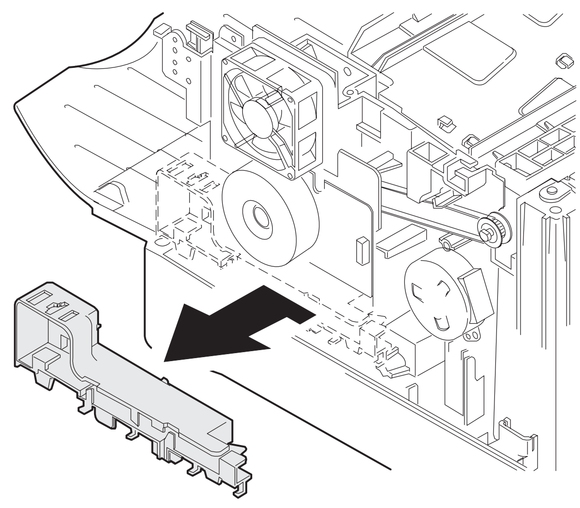
11) Release the belt pulley lock and remove the belt pulley bearing.



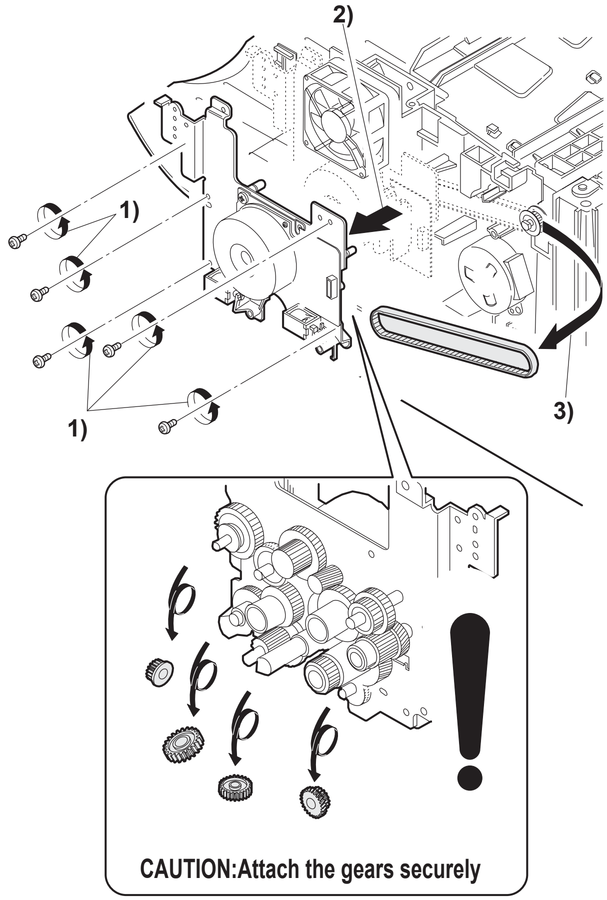
12) Remove the paper exit roller.



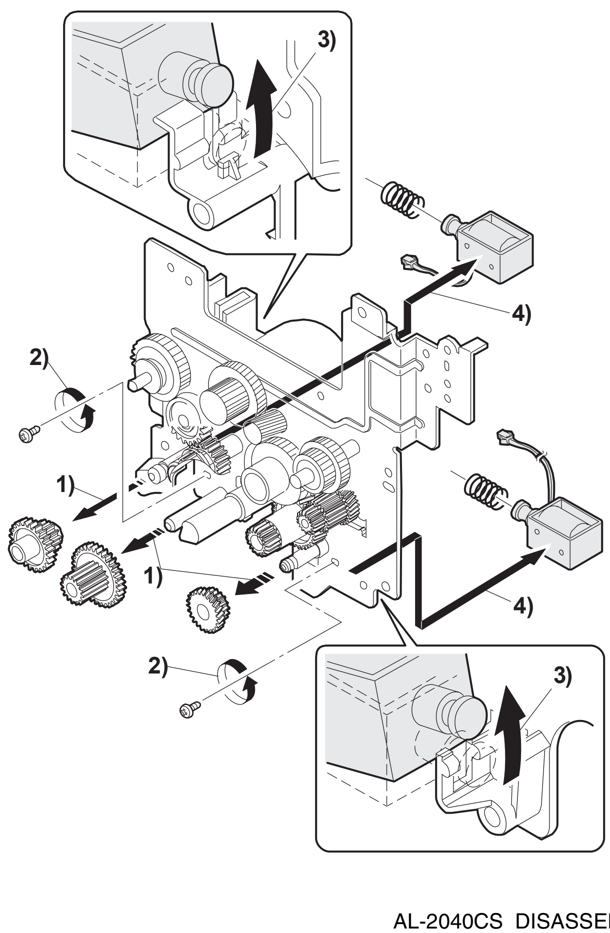
13) Remove the harness guide.



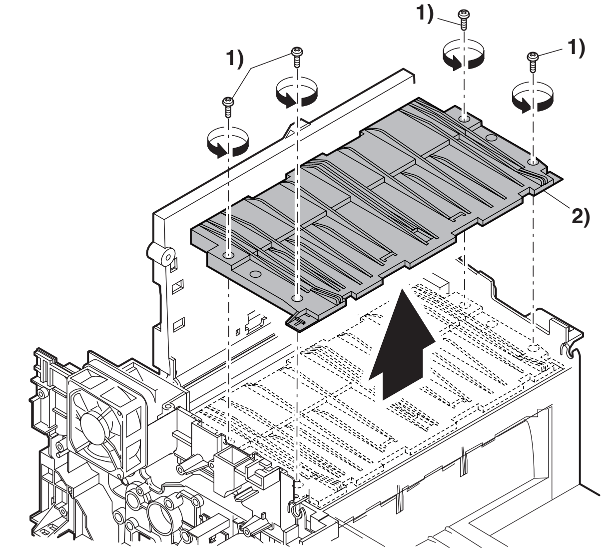
14) Remove five screws and remove the main drive plate and the belt.



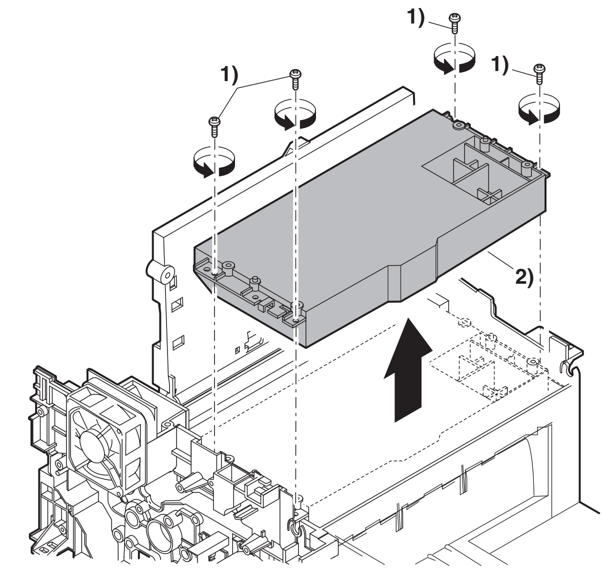
15) Remove the parts as shown below, and remove the pressure release solenoid and the paper feed solenoid.



16) Remove four screws, and remove the paper guide unit.



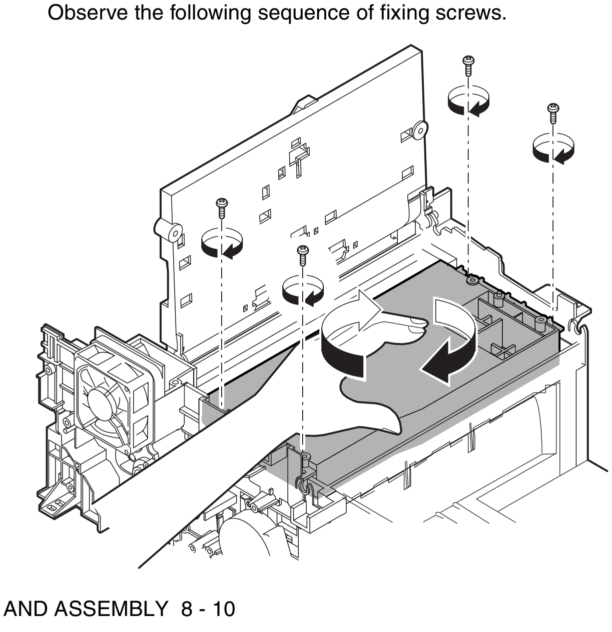
17) Remove four screws, and remove the LSU unit.



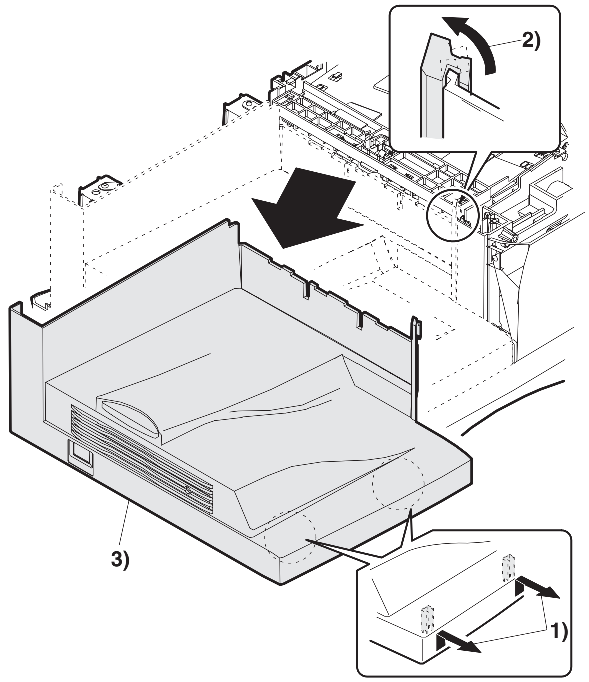
[Note for assembling the LSU]

When installing the LSU, turn the LSU clockwise and fix with screws in order to provide an attachment backlash in the proper direction.

Observe the following sequence of fixing screws.

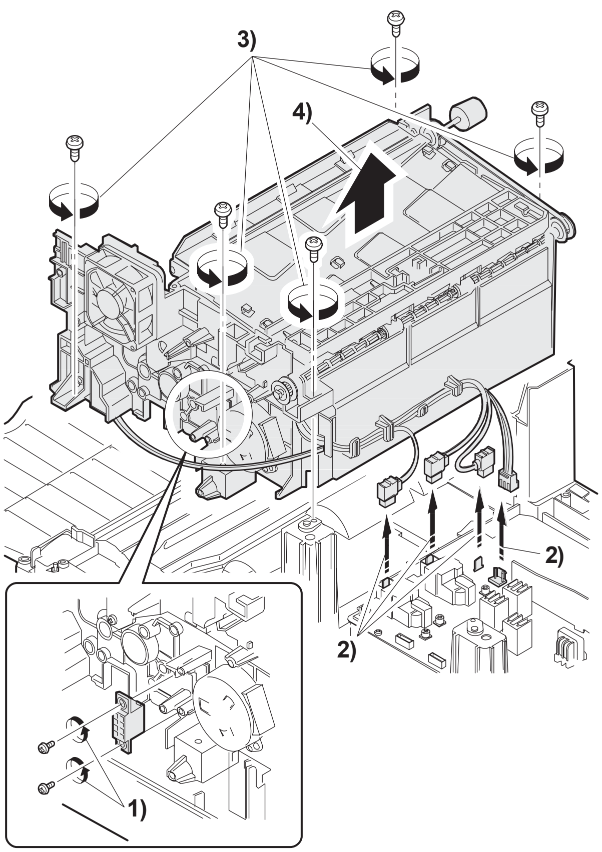


18) Remove each pawl, and remove the paper exit tray.



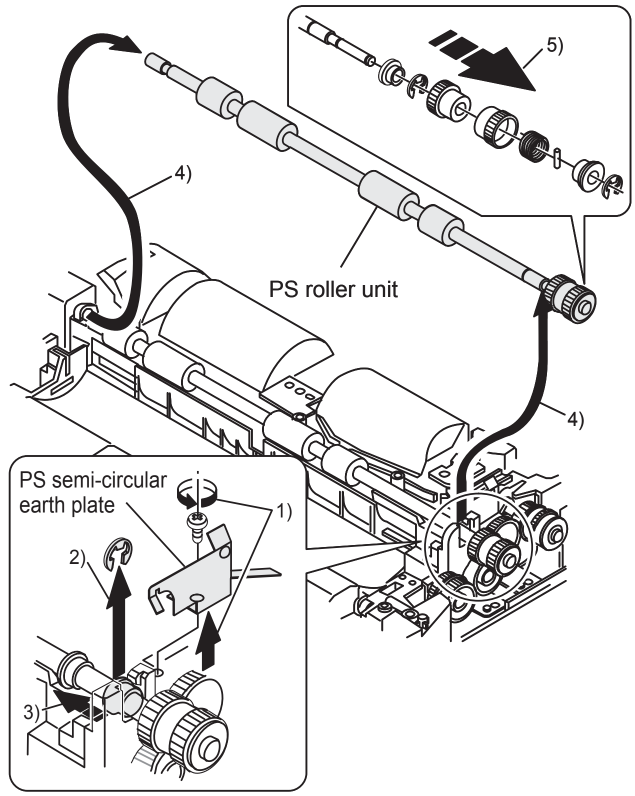
19) Remove two screws and remove the fusing connector.

20) Remove five screws and the connector, and lift the intermediate frame unit to remove.

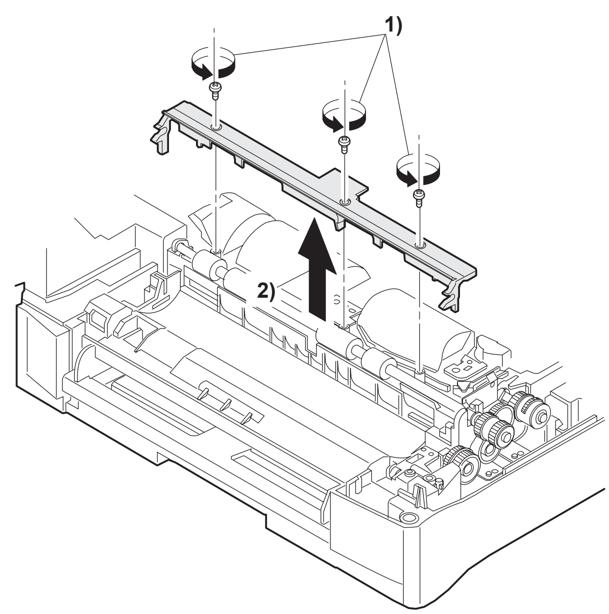


21) Remove the screw and the E-ring, and remove the PS semi-circular earth plate and the PS roller unit.

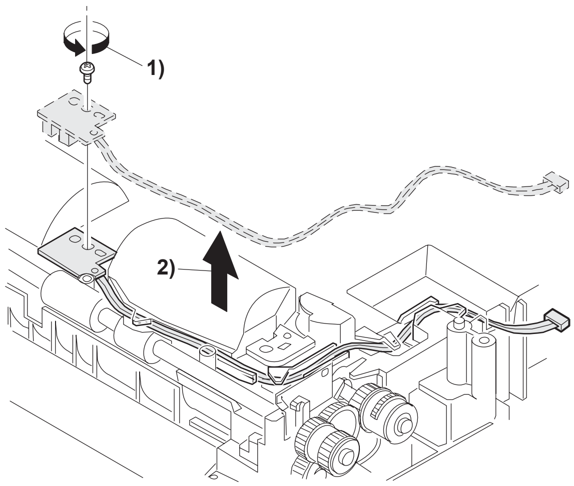
22) Remove the E-ring and remove the spring clutch from the PS roller unit.



23) Remove three screws and remove the TC front paper guide.

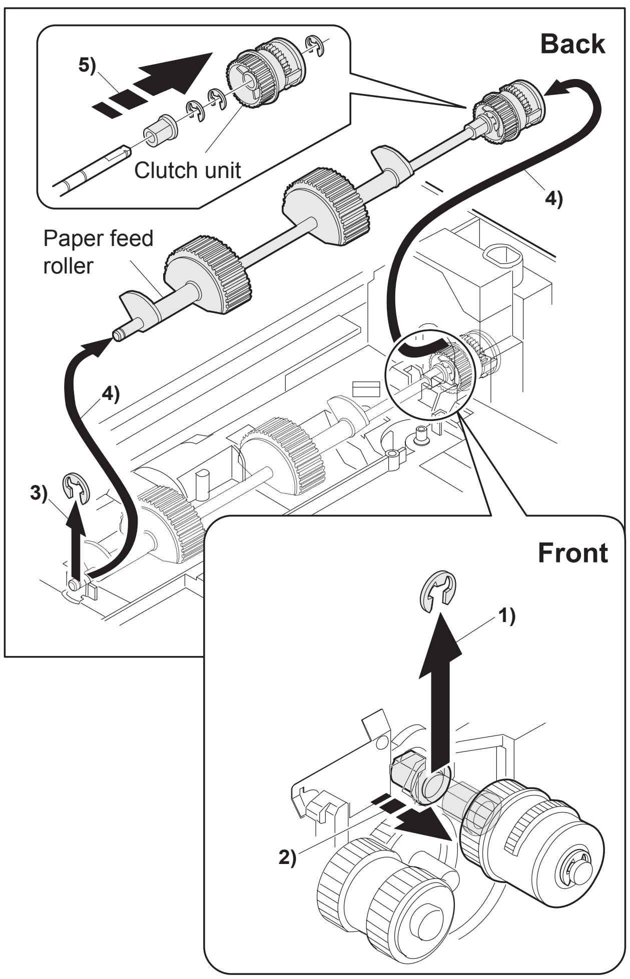


24) Remove the screw and the connector, and remove the PPD1 sensor PWB.



25) Remove two E-rings and remove the paper feed roller.

26) Remove three E-rings and remove the clutch unit.



C. Assembly procedure

For assembly, reverse the disassembly procedure.

6. Manual paper feed section

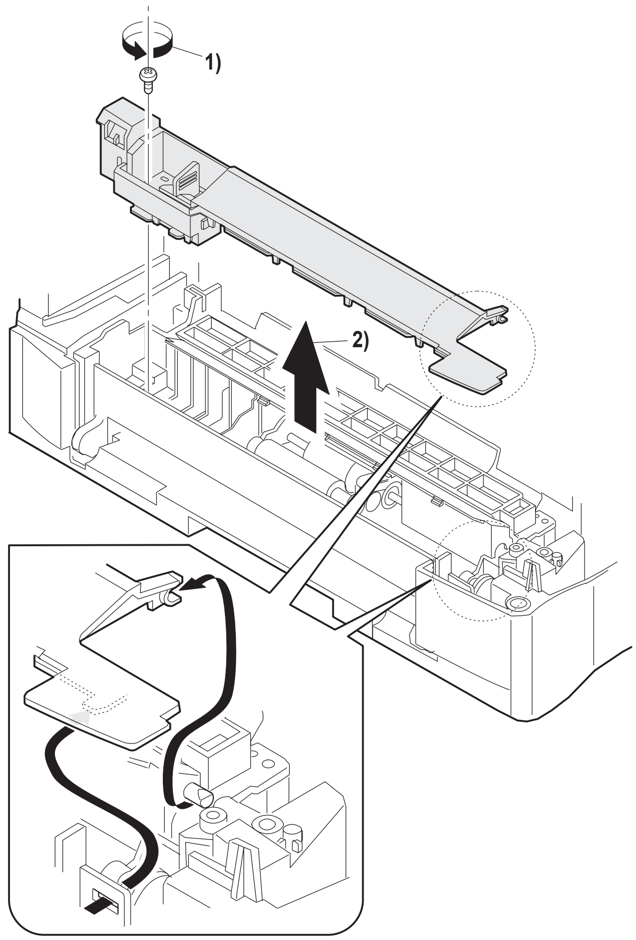
A. List

No.	Part name Ref.
1	Manual transport roller
2	Cassette detection switch
3	PPD1 sensor PWB
4	Side door detection unit

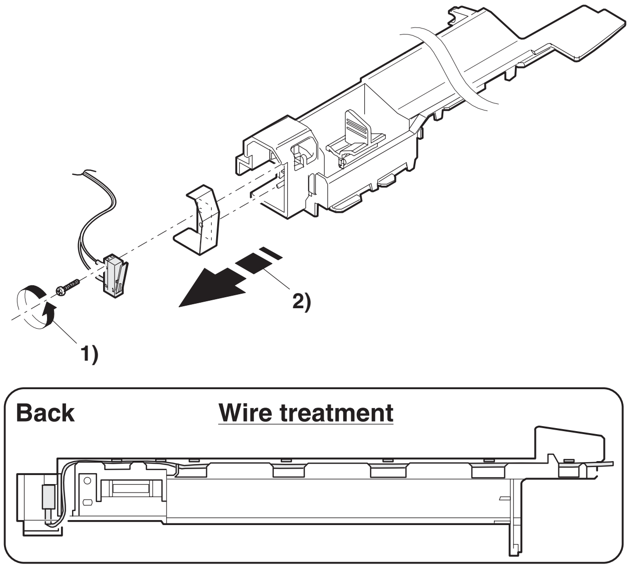
B. Disassembly procedure

Multi unit

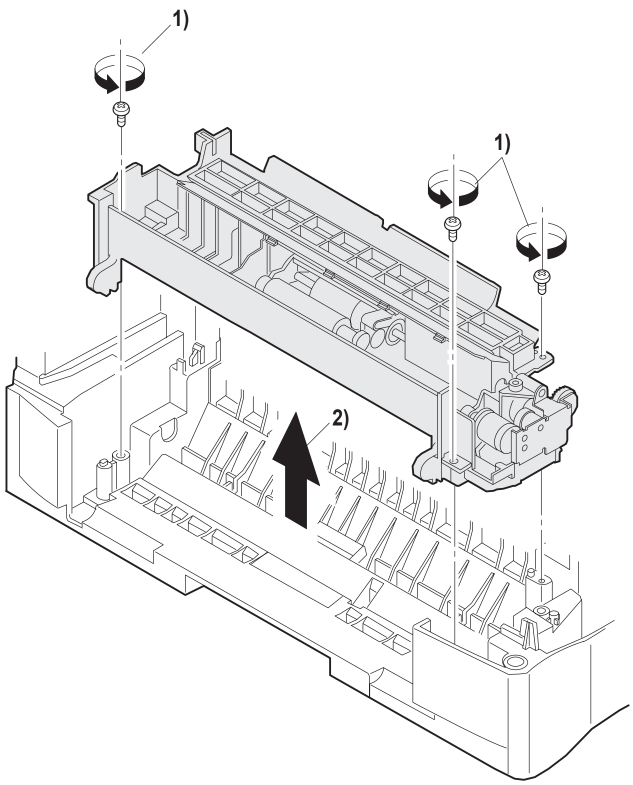
1) Remove the screw and remove the multi upper cover.



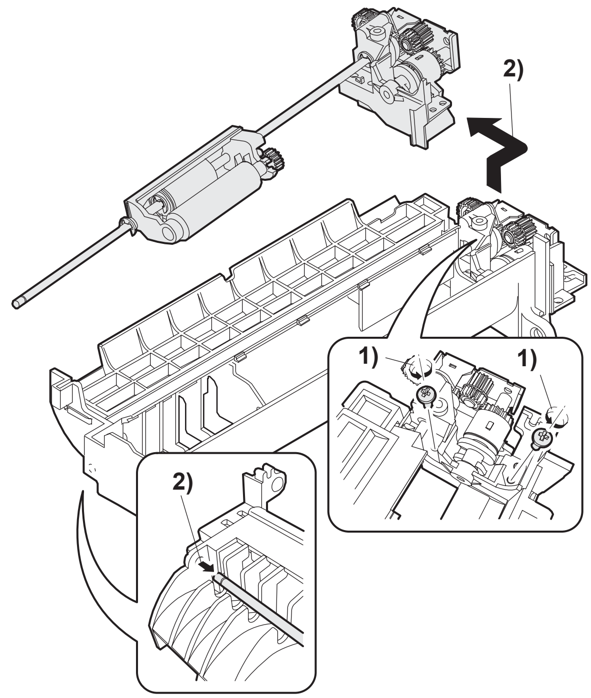
2) Remove the screw and remove the side door detection unit.



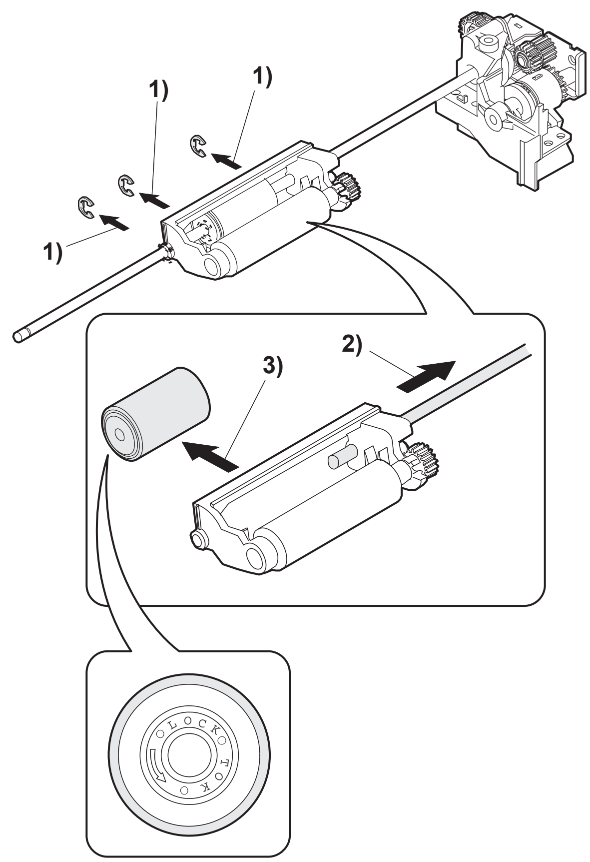
3) Remove three screws and remove the multi paper feed upper frame.



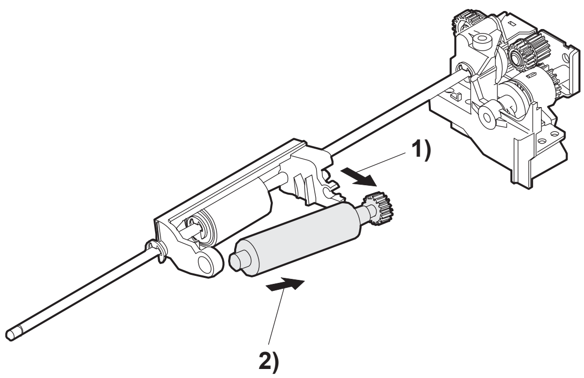
4) Remove two screws and remove the multi feed bracket unit from the multi paper feed upper frame.



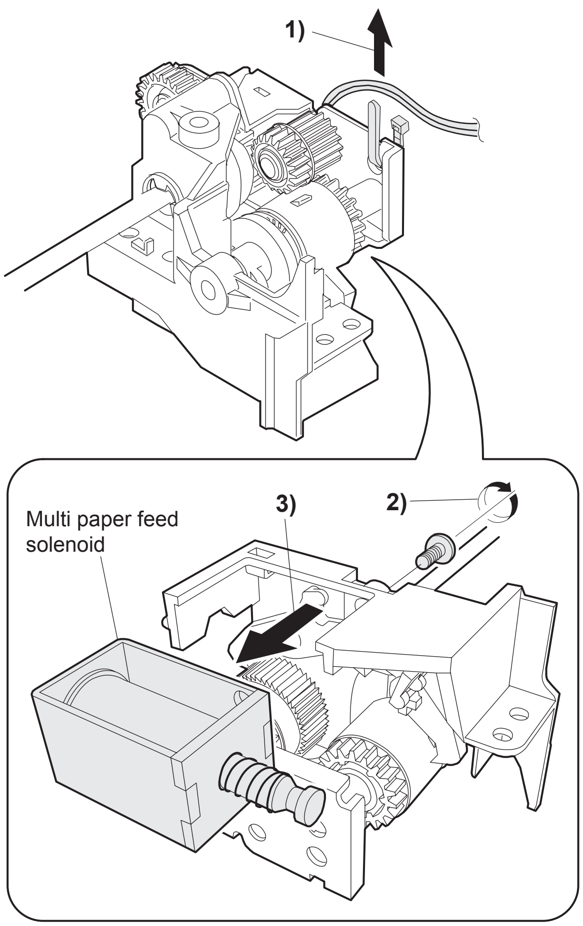
5) Remove three E-rings and remove the manual paper feed roller B9.



6) Remove the pick-up roller.



7) Cut the binding band and remove the multi paper feed solenoid.

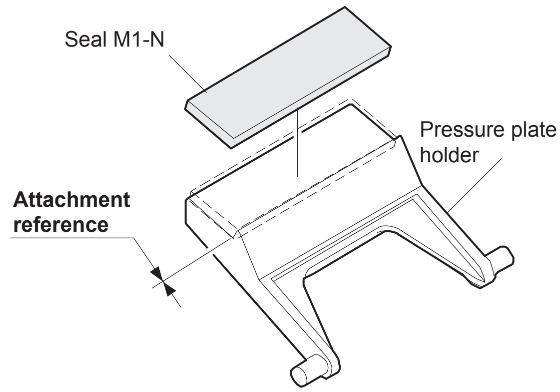


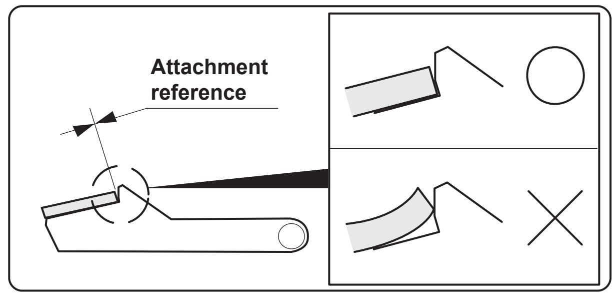
C. Assembly procedure

For assembly, reverse the disassembly procedure.

D. Pressure plate holder attachment

1) Attach the pressure plate holder so that the resin section is not covered with the seal M1-N.





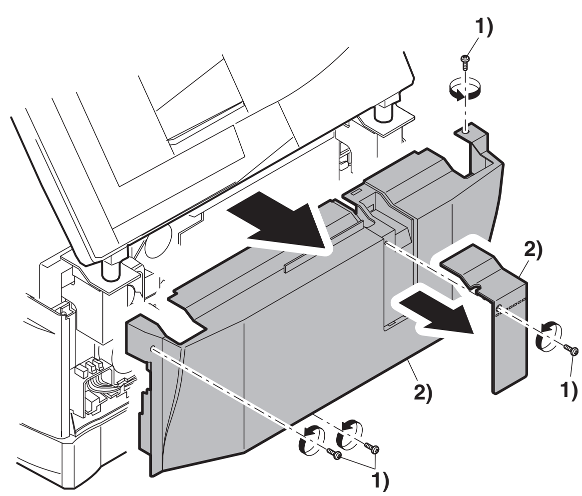
7. Rear frame section

A. List

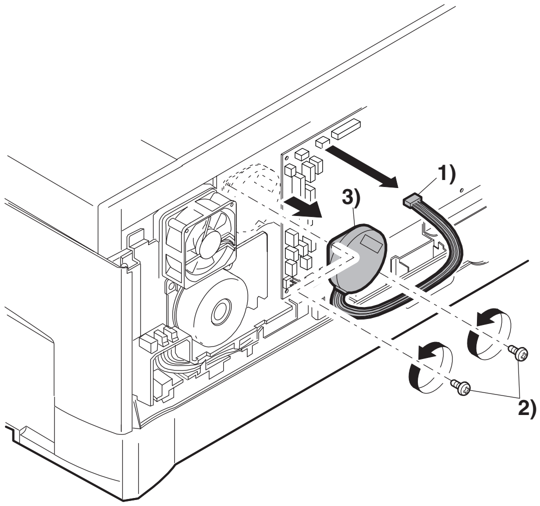
No.	Part name Ref.
1	Scanner motor
2	Main motor
3	Exhaust fan motor
4	NIC PWB
5	Main PWB

B. Disassembly procedure

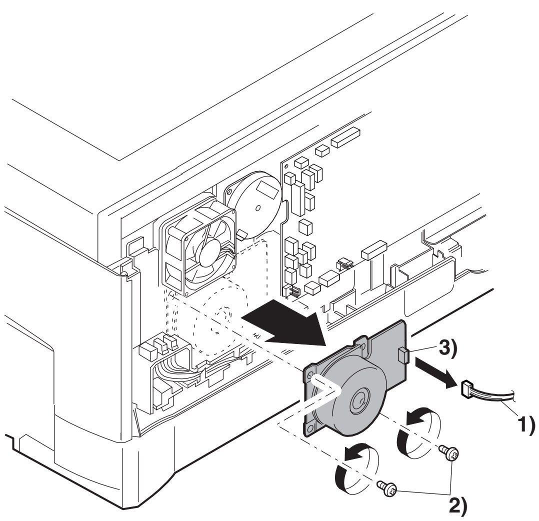
1) Remove four screws, and remove the rear cabinet and the rear cabinet cover.



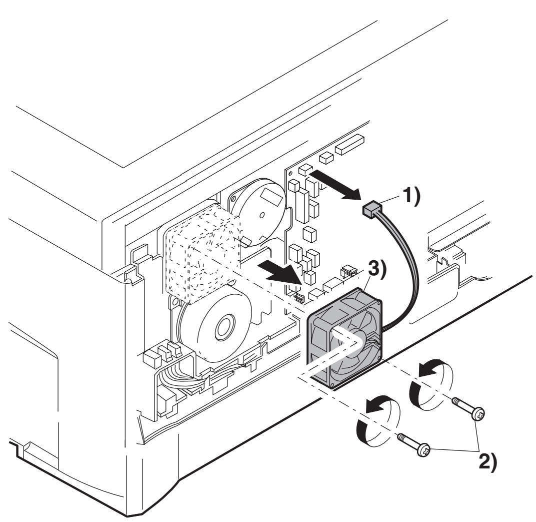
2) Disconnect the connector.
3) Remove two screws, and remove the scanner motor.



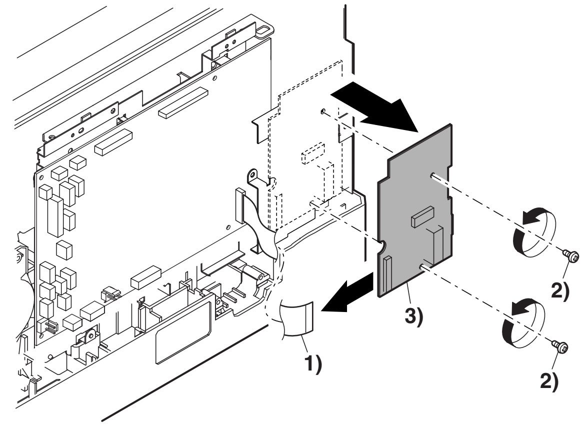
4) Remove two screws and one harness, and remove the main motor.



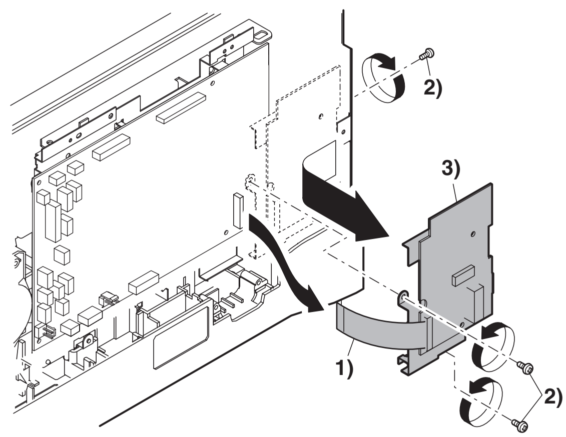
5) Remove two screws and one connector, and remove the exhaust fan motor.



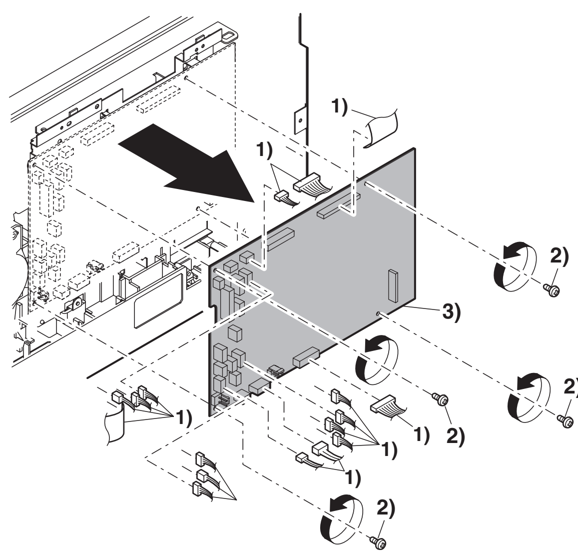
6) Disconnect the connector.
7) Remove the two screws, and remove the NIC PWB.



8) Disconnect the connector.
9) Remove the three screws, and remove the NIC PWB unit.



10) Disconnect the connectors.
11) Remove the five screws, and remove the MCU PWB.



C. Assembly procedure

For assembly, reverse the disassembly procedure.

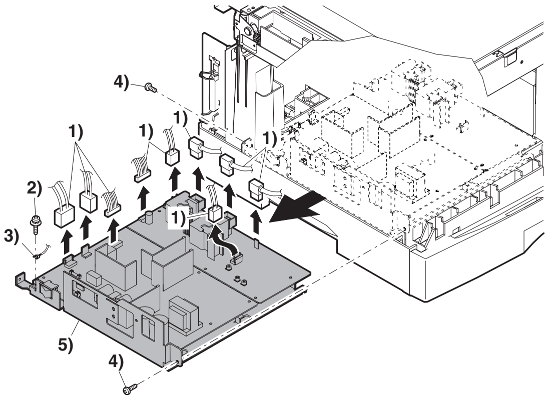
8 Power section

A. List

No.	Part name Ref.
1	Power PWB

B. Disassembly procedure

1) Disconnect each connector.
2) Remove the screw, and remove the earth line.
3) Remove two screws, and remove the power PWB unit.



C. Assembly procedure

For assembly, reverse the disassembly procedure.

9. SPF section

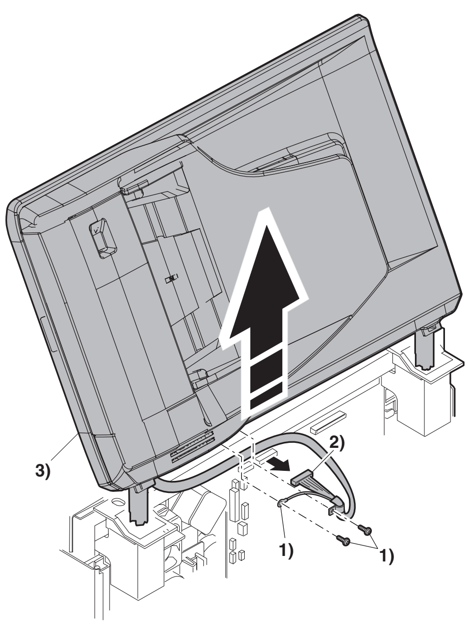
No.	Part name Ref.
A	SPF motor
B	Pick-up roller, paper feed roller
C	Paper exit roller
D	Set sensor, scan front sensor
E	Transport roller

(1) Rear cabinet disassembly

1) Remove four screws.
2) Remove the rear cabinet.

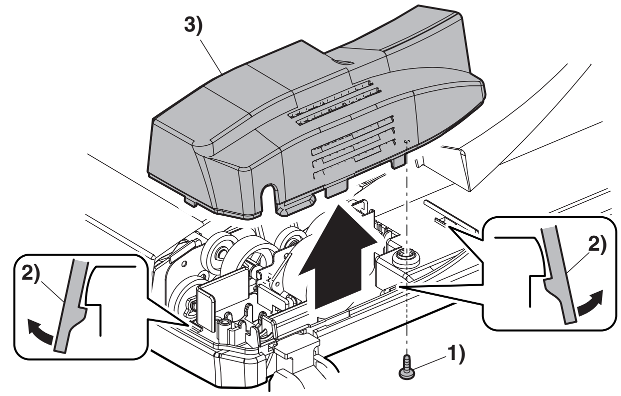
(2) Remove the SPF.

1) Remove two screws, and remove the earth wire.
2) Disconnect the connector.
3) Remove the SPF unit.

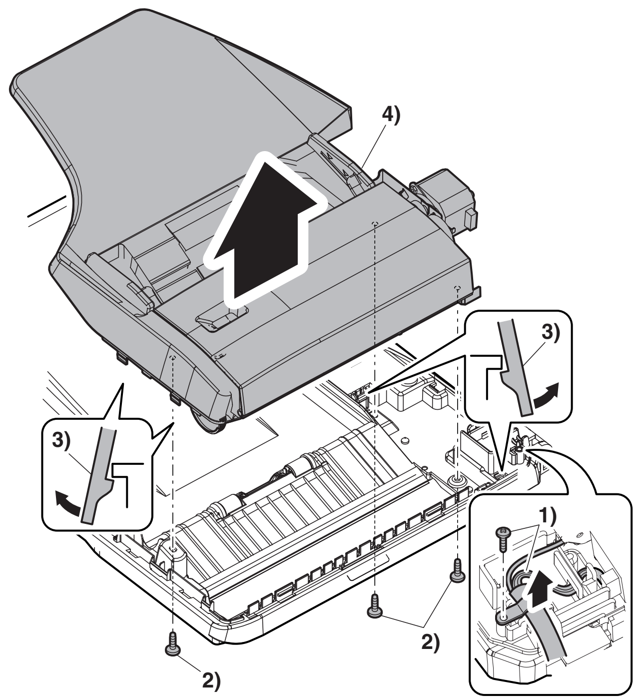


A. SPF motor

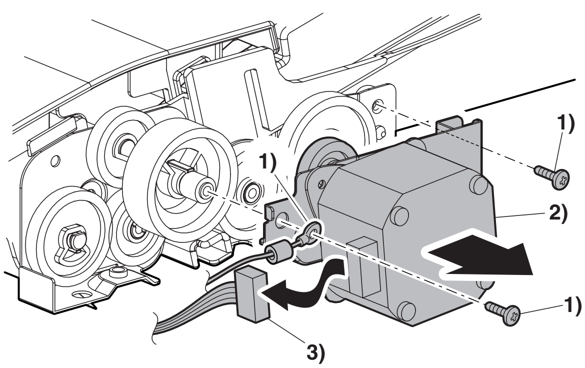
1) Remove the screw.
2) Disengage the pawl (3 positions).
3) Remove the rear cabinet.



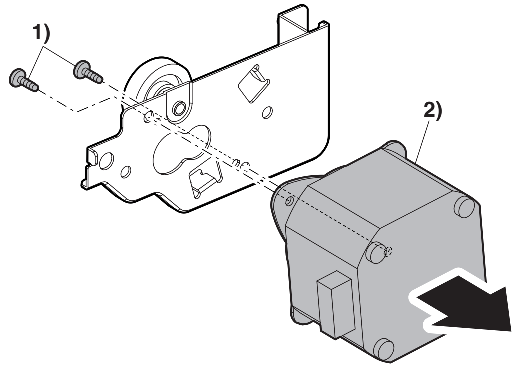
1) Remove the screw, and remove the harness.
2) Remove three screws.
3) Disengage the pawl (4 positions).
4) Remove the transport unit.



1) Remove two screws, and remove the earth wire.
2) Remove the SPF motor unit.
3) Disconnect the connector.

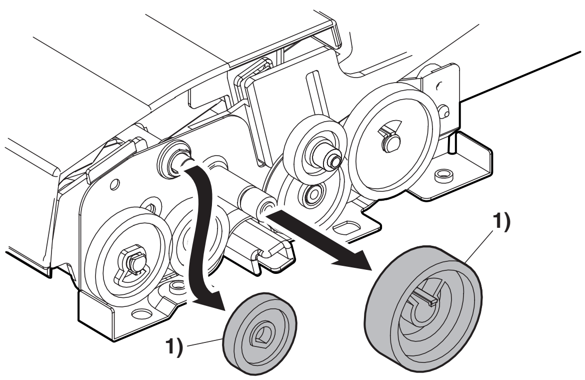


1) Remove two screws.
2) Remove the SPF motor.

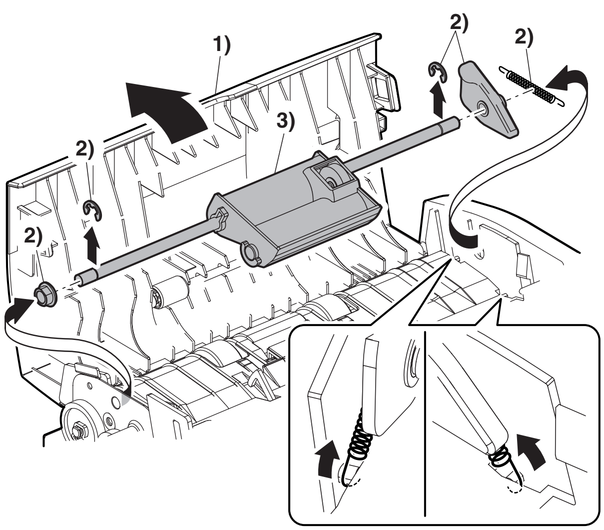


B. Pick-up roller, paper feed roller

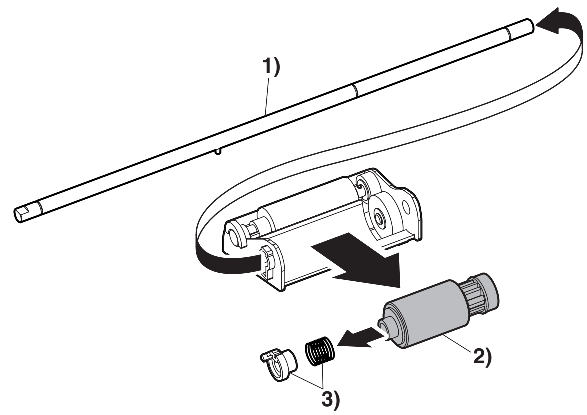
1) Remove two gears.



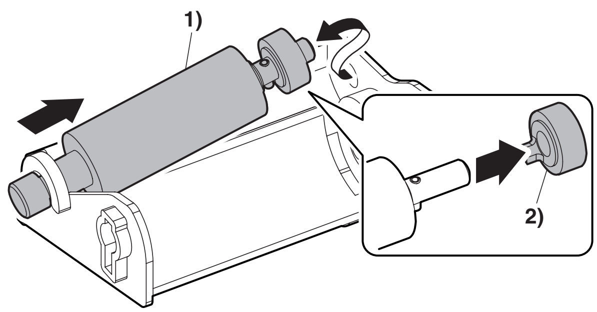
1) Open the upper door.
2) Remove two E-rings, and remove the spring, the arm, and the bearing.
3) Remove the pick-up roller unit.



1) Remove the shaft.
2) Remove the paper feed roller.
3) Remove the bearing and the spring.

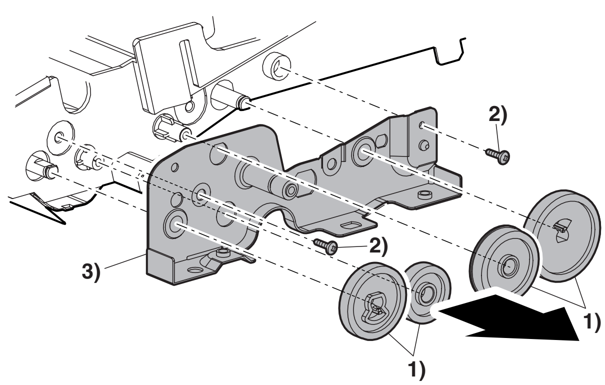


1) Remove the pick-up roller.
2) Remove the gear.

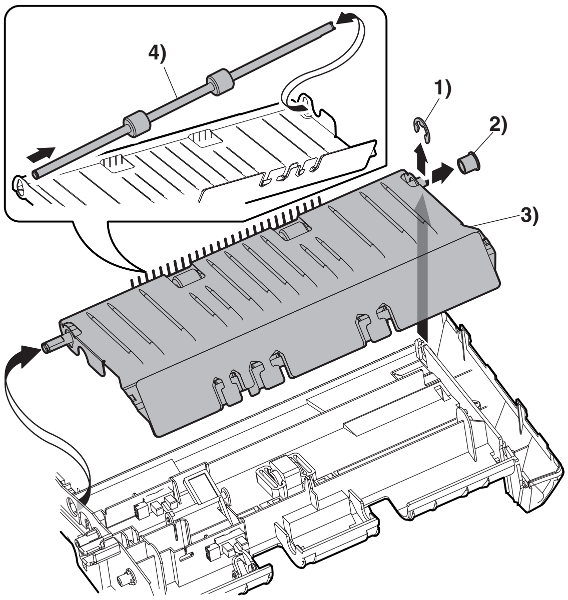


C. Paper exit roller

1) Remove four gears.
2) Remove two screws.
3) Remove the frame.



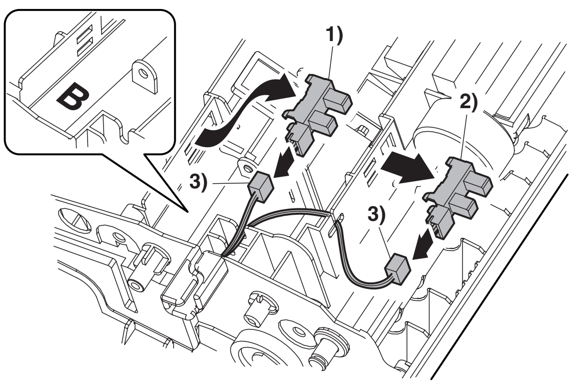
1) Remove the E-ring.
2) Remove the bearing.
3) Remove the paper guide unit.
4) Remove the paper exit roller.



D. Set sensor, scan front sensor

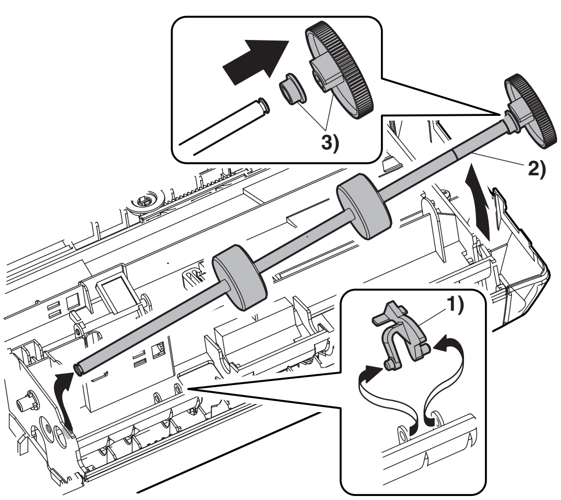
1) Remove the set sensor.
2) Remove the scan front sensor.
3) Disconnect the connectors.

∗ When assembling, attach the blue harness to the marking B side of the sensor, and attach the orange harness to the opposite side sensor.



E. Transport roller

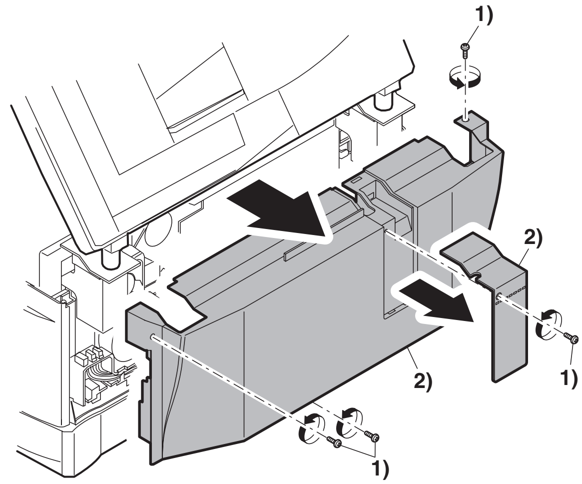
1) Remove the actuator.
2) Remove the transport roller.
3) Remove the gear and the bearing.



10. 2nd cassette section

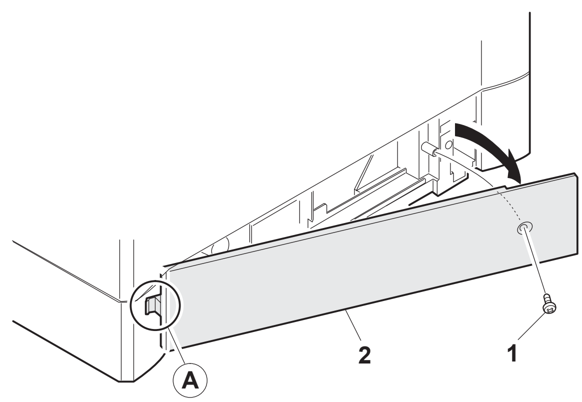
No.	Part name Ref.
A	Paper sensor
B	Cassette detection SW
C	Paper feed solenoid
D	Transport roller
E	Paper feed clutch
F	2nd paper feed roller

Paper feed unit removal

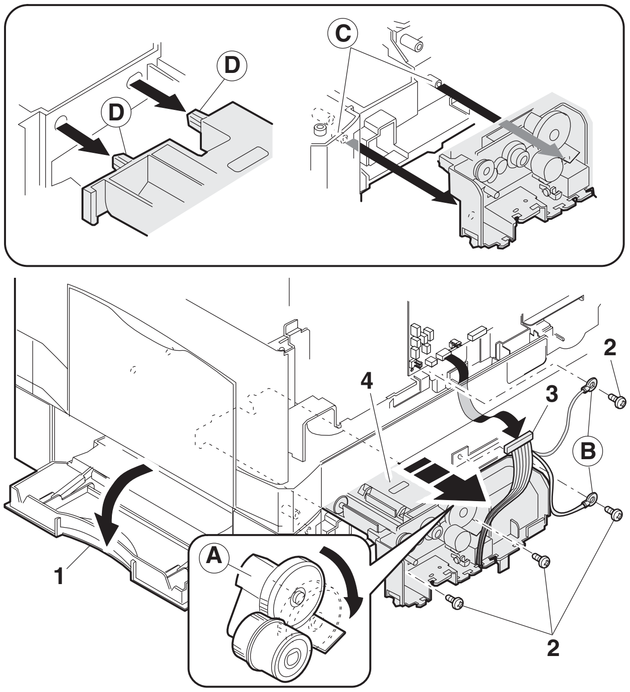


1) Remove the screw.
2) Remove the rear cover.

∗ When installing, engage the pawl and install the unit.



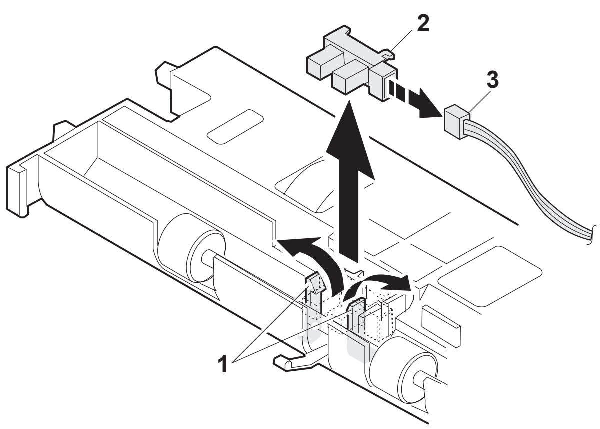
1) Open the right cabinet.
2) Remove three screws.
3) Remove one connector from MCU.
4) While tilting down the 2nd connection arm A, pull and remove the paper feed unit toward you.



∗ When installing, securely insert two bosses C on the machine side and two bosses D on the paper feed unit side. Be sure to secure the ground wire B.
∗ Insert the 2nd page feed.

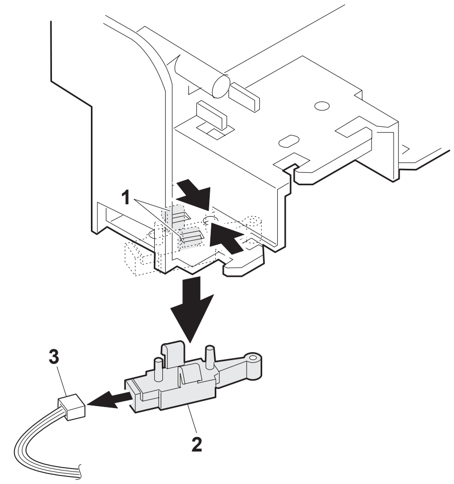
A. Paper sensor

1) Remove the pawl.
2) Remove the paper sensor.
3) Remove the harness.



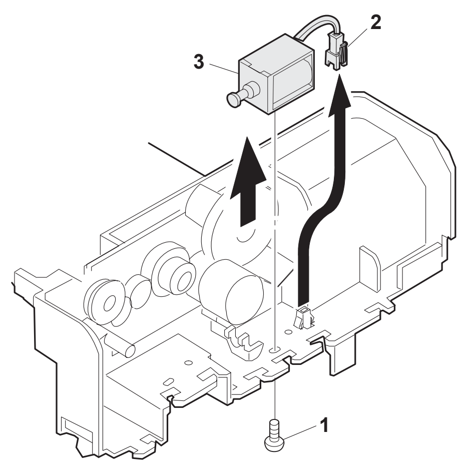
B. Cassette detection switch

1) Remove the pawl.
2) Remove the cassette detection switch.
3) Remove the harness.



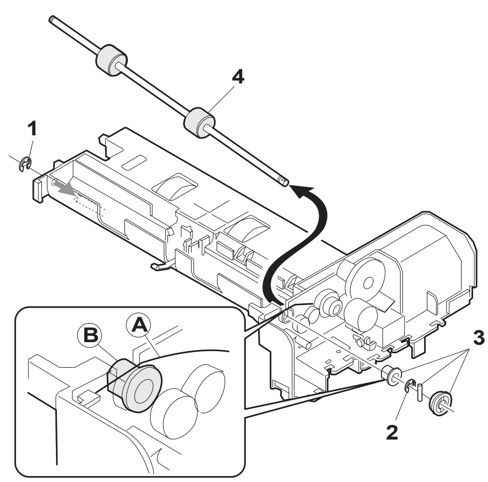
C. Paper feed solenoid

1) Remove the screw.
2) Remove the connector.
3) Remove the paper feed solenoid.



D. Transport roller

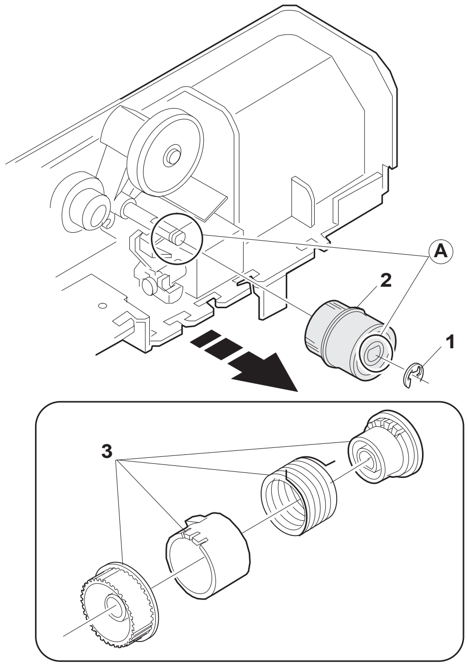
1) Remove two E-rings.
2) Remove the transport roller.



∗ Install so that the earth spring A is brought into contact over bearing B.

E. Paper feed clutch

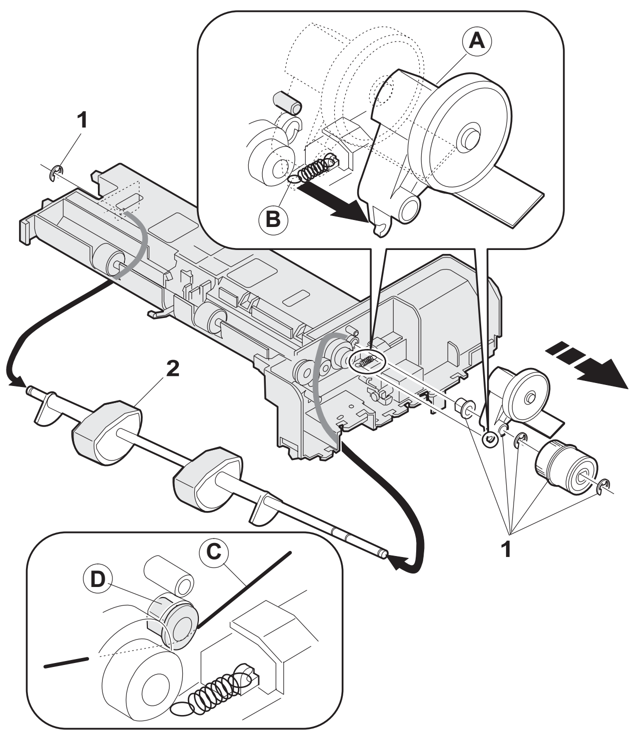
1) Remove the E-ring.
2) Remove the paper feed clutch.
3) Remove the parts.



∗ When installing, fit the cut surface A.

F. 2nd paper feed roller

1) Remove the E-ring and the parts.
2) Remove the 2nd paper feed roller.



∗ When installing, hang the 2nd connection arm on the 2nd connection arm Spring B. Be sure to install so that the earth spring C is in contact under the bearing D.

[9] ADJUSTMENTS

1. Optical section

A. Copy magnification ratio adjustment

The copy magnification ratio must be adjusted in the main scanning direction and in the sub scanning direction. To adjust, use SIM 48-1.

(1) Outline

The main scanning (front/rear) direction magnification ratio adjustment is made automatically or manually.

Automatic adjustment: The width of the reference line marked on the shading correction plate is scanned to perform the main scanning (front/rear) direction magnification ratio adjustment automatically.

Manual adjustment: The adjustment is made by manual key operations. (In either of the automatic and manual adjustments, the zoom data register set value is changed for adjustment.)

The magnification ratio in the sub scanning direction is adjusted by changing the carriage (scanner) scanning speed.

(2) Main scanning direction magnification ratio adjustment

a. Cases when the adjustment is required

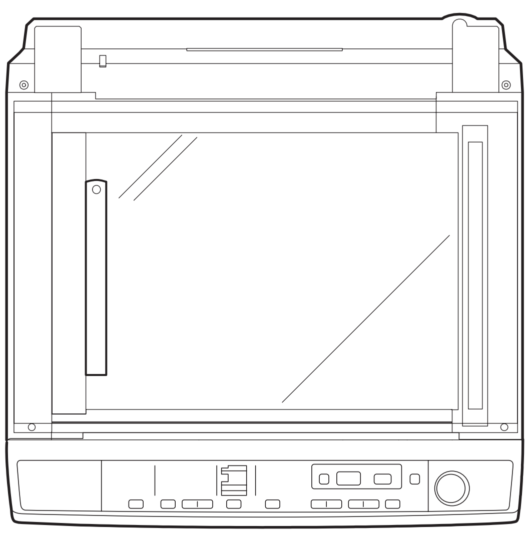
1) When the main PWB is replaced.
2) When the EEPROM in the main PWB is replaced.
3) When "U2" trouble occurs.
4) When repairing or replacing the optical section.

b. Necessary tools

- Screwdriver (+)
- Scale

c. Adjustment procedure

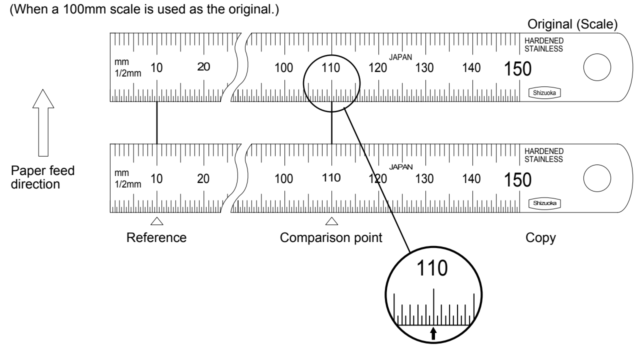
1) Set the scale vertically on the document table. (Use a long scale for precise adjustment.)



2) Set the copy magnification ratio to 100%.
3) Make a copy on A4 or 81/2" x 11" paper.
4) Measure the length of the copied scale image.
5) Calculate the main scanning direction magnification ratio.
   Main scanning direction magnification ratio

$$= \frac{\text{Copy image dimensions}}{\text{Original dimension}} \times 100\ (\%)$$

(When a 100mm scale is used as the original.)



6) Check that the copy magnification ratio is within the specified range. If it is not within the specified range, perform the following procedures.
7) Execute SIM 48-1 to select the main scanning direction copy magnification ratio adjustment mode.
   To select the adjustment mode, use the copy mode select key.

In the case of the automatic adjustment, when the START switch is pressed, the mirror base unit moves to the white plate for shading to scan the width of the reference line, calculating the correction value and displaying and storing this value.

After execution of the automatic adjustment, go out from the simulation mode and make a copy to check the magnification ratio.

If the magnification ratio is not in the specified range (100 ± 1.0%), manually adjust as follows.

Adjustment mode	Lighting lamp	Default
Main scanning direction magnification ratio adjustment	TEXT lamp ON	50
Sub scanning direction magnification ratio adjustment	PHOTO lamp ON	50

8) Enter the new set value of main scanning direction copy magnification ratio with the copy quantity set key, and press the START button.
9) Change the set value and repeat the adjustment until the ratio is within the specified range.
   When the set value is changed by 1, the magnification ratio is changed by 0.1%.

(3) Sub scanning direction copy magnification ratio

a. Cases when the adjustment is required

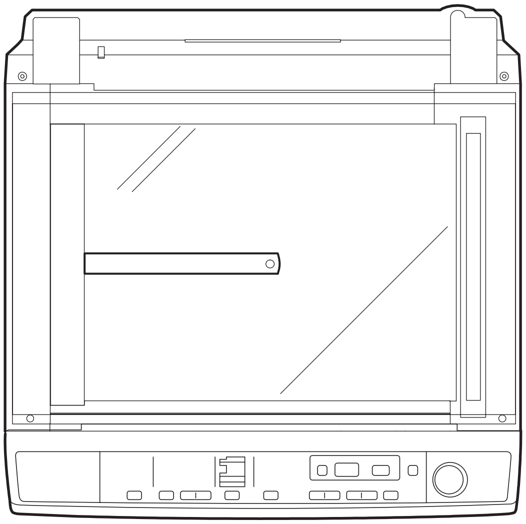
1) When the scanner unit drive section is disassembled or the part is replaced.
2) When the main PWB is replaced.
3) When the EEPROM in the main PWB is replaced.
4) When "U2" trouble occurs.

b. Necessary tools

- Scale

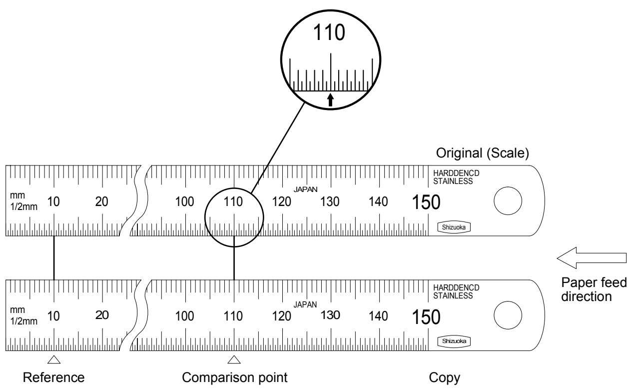
c. Adjustment procedure

1) Set the scale on the document table as shown below. (Use a long scale for precise adjustment.)



2) Set the copy magnification ratio to 100%.
3) Make a copy on A4 or 81/2" x 11" paper.
4) Measure the length of the copied scale image.
5) Calculate the sub scanning direction copy magnification ratio using the formula below.

$$= \frac{\text{Copy image dimensions}}{\text{Original dimension}} \times 100\ (\%)$$



6) Check that the actual copy magnification ratio is within the specified range. (100 ± 1.0%).
   If it is not within the specified range, perform the following procedures.
7) Execute SIM 48-1 to select the sub scanning direction copy magnification ratio adjustment mode.
   To select the adjustment mode, use the copy mode select key. (PHOTO lamp ON)
8) Enter the new set value of sub scanning direction copy magnification ratio with the copy quantity set key, and press the START button.

Repeat procedures 1) - 8) until the sub scanning direction actual copy magnification ratio in 100% copying is within the specified range.

When the set value is changed by 1, the magnification ration is changed by 0.1%.

B. Image position adjustment

There are following five kinds of image position adjustments, which are made by laser control except for the image scan start position adjustment. For the adjustments, SIM 50-01, 50-06, 50-10, 50-18 and SIM 50-19 are used.

No.	Adjustment item	Simulation
1	Print start position (Main cassette)	50 - 01
2	Print start position (2nd cassette)	50 - 01
3	Print start position (Manual feed)	50 - 01
4	Image lead edge void amount	50 - 01
5	Image scan start position	50 - 01
6	Image rear edge void amount	50 - 01
7	SPF image scan start position	50 - 06
8	SPF rear edge void amount	50 - 06
9	Center offset	50 - 10
10	Memory reverse position adjustment in duplex copy	50 - 18
11	Duplex copy rear edge void adjustment	50 - 19
12	Duplex back print start position	50 - 19

To select the adjustment mode with SIM 50-01, use the copy mode select key.

The relationship between the adjustment modes and the lighting lamps are as shown in the table below.

	Adjustment mode	Lamp ON
	Print start position (Main cassette paper feed)	AE, main cassette lamp
☆	Print start position (2nd cassette paper feed)	AE, 2nd cassette lamp
	Print start position (Manual paper feed)	AE, manual feed lamp
	Image lead edge void quantity	TEXT lamp
	Image scan start position	PHOTO lamp
	Image rear edge void quantity	AE, TEXT, PHOTO lamp

☆ : Supported for the installing model and skipped for non-installing mode.

To select the adjustment mode with SIM 50-10, use the copy mode select key.

The relationship between the adjustment modes and the lighting lamps are as shown in the table below.

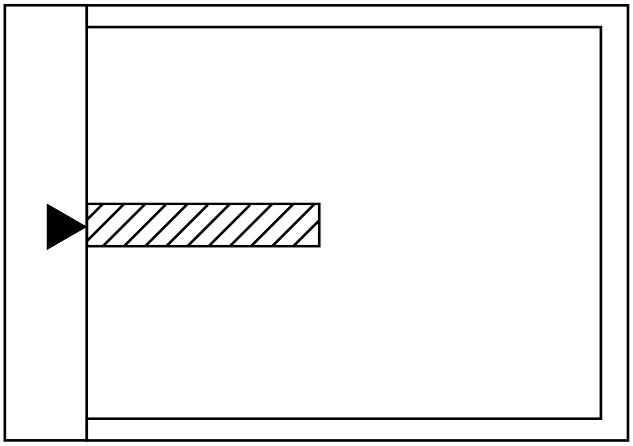
Machine with the multi manual paper feed unit

	Adjustment mode	Lamp ON
	Print center offset (Main cassette paper feed)	AE, main cassette lamp
☆	Print center offset (2nd cassette)	AE, 2nd cassette lamp
	Print center offset (Manual paper feed)	AE, manual paper feed lamp
☆	Second side center offset	TEXT lamp

☆ : Supported for the installing model and skipped for non-installing mode.

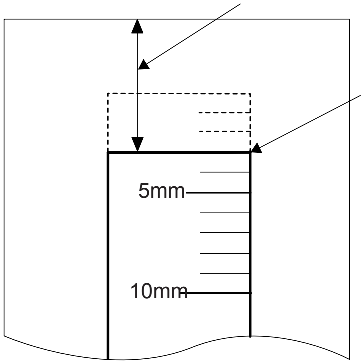
(1) Lead edge adjustment

1) Set a scale to the center of the paper lead edge guide as shown below, and cover it with B4 or 8 1/2" x 14" paper.



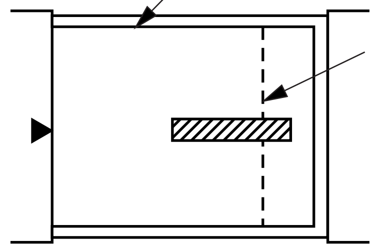
2) Execute SIM 50-01
3) Set the print start position (AE lamp ON) (A), the lead edge void amount (TEXT lamp ON) (B), and the scan start position (PHOTO lamp ON) (C) to 0, and make a copy of a scale at 100%.
4) Measure the image loss amount (R mm) of the scale image.
   Set C = 10 X R (mm). (Example: Set the value of C to 30.)
   When the value of C is increased by 10, the image loss is decreased by 1mm. (Default: 50)
5) Measure the distance (H mm) between the paper lead edge and the image print start position.
   Set A = 10 X H (mm). (Example: Set the value of A to 50.)
   When the value of A is increased by 10, the image lead edge is shifted to the paper lead edge by 1mm. (Default: 50)
6) Set the lead edge void amount to B = 50 (2.5mm).
   When the value of B is increased by 10, the void amount is increased by about 1mm. For 25 or less, however, the void amount becomes zero. (Default: 50)

(Example)

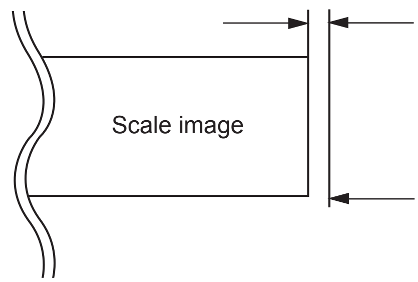


(2) Image rear edge void amount adjustment

1) Set a scale to the rear edge section of A4 or 11" x 8 1/2" paper size as shown in the figure below, and cover it with B4 or 8 1/2" x 14" paper.



2) Execute SIM 50-01 to select the image rear edge void amount adjustment mode.
   The set adjustment value is displayed on the copy quantity display.
3) Make a copy and measure the void amount of image rear edge.



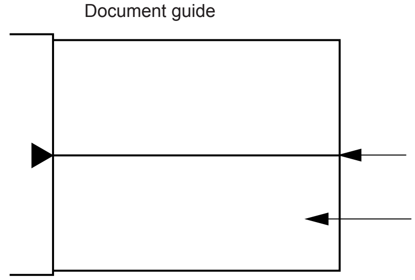
4) If the measurement value is out of the specified range, change the set value and repeat the adjustment procedure.
   The default value is 50.

Note: The rear edge void cannot be checked with the first sheet after entering the simulation mode, the first sheet after turning off/on the power, or the first sheet after inserting the cassette. Use the second or later sheet to check the rear edge void.

(3) Center offset adjustment

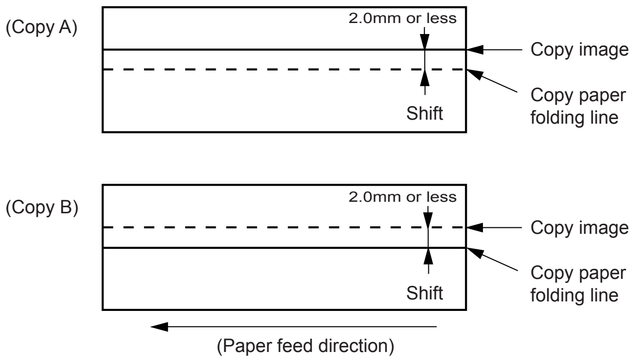
1) Set the self-made test chart for the center position adjustment so that its center line is aligned with the center mark of the document guide.

- Test chart for the center position adjustment.
  Draw a line at the center of A4 or 8 1/2" x 11" paper in the paper transport direction.



2) Execute SIM 50-10 to select the print center offset (cassette paper feed) adjustment mode.
   The set adjustment value is displayed on the copy quantity display.

3) Make a copy and check that the copied center line is properly positioned.
The standard value is 0 ± 2mm from the paper center.



4) If the measured value is out of the specified range, change the set value and repeat the adjustment procedure.
When the set value is increased by 1, the copy image is shifted by 0.1mm toward the rear frame.

- For the manual paper feed, change the manual paper feed adjustment mode and perform the similar procedures.
- Since the document center offset is automatically adjusted by the CCD which scan the reference lines (F/R) on the back of document guide, there is no need to adjust manually.

2. Copy density adjustment

A. Copy density adjustment timing

The copy density adjustment must be performed in the following cases:

- When maintenance is performed.
- When the developing bias/grid bias voltage is adjusted.
- When the optical section is cleaned.
- When a part in the optical section is replaced.
- When the optical section is disassembled.
- When the OPC drum is replaced.
- When the main control PWB is replaced.
- When the EEPROM on the main control PWB is replaced.
- When the memory trouble (U2) occurs.

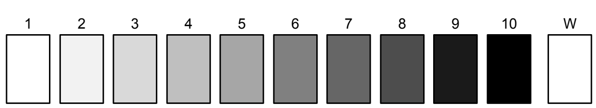
B. Note for copy density adjustment

1) Arrangement before execution of the copy density adjustment

- Clean the optical section.
- Clean or replace the charger wire.
- Check that the voltage at the high voltage section and the developing bias voltage are in the specified range.

C. Necessary tool for copy density adjustment

- One of the following test charts:
UKOG-0162FCZZ, UKOG-0089CSZZ, KODAK GRAY SCALE
- B4 (14" x 8 1/2") white paper
- The user program AE setting should be "3."



Test chart comparison table

UKOG-0162FCZZ DENSITY No.	1	2	3	4	5	6	7	8	9	10	W
UKOG-0089CSZZ DENSITY No.	0.1		0.2		0.3				0.5	1.9	0
KODAK GRAY SCALE		1		2		3		4		19	A

D. Features of copy density adjustment

For the copy density adjustment, the image data shift function provided in the image process LSI is used.

List of the adjustment modes

Auto Mode	Brightness 1 step only
Manual Mode	Brightness 5 steps. Adjustment of only the center brightness is made.
Photo Mode	Brightness 5 steps. Adjustment of only the center brightness is made.
Manual T/S mode	Brightness 5 steps. Adjustment of only the center brightness is made.
T/S Auto mode	Brightness 1 step only

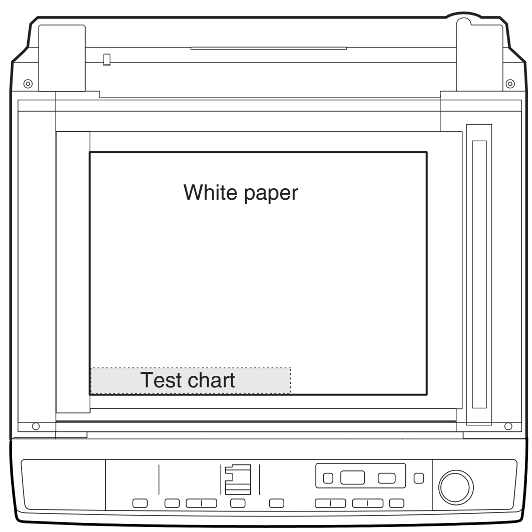
E. Copy density adjustment procedure

Use SIM 46-1 to set the copy density for each copy mode.

For selection of modes, use the copy mode select key.

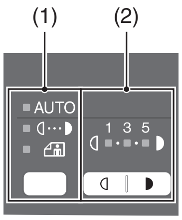
(1) Test chart (UKOG-0162FCZZ) setting

1) Place the test chart so that its edge is aligned with the A4 (Letter) reference line on the document table. Then place a A4 (14" x 8 1/2") white paper on the test chart and close the document cover.



(2) Perform the adjustment in each mode.

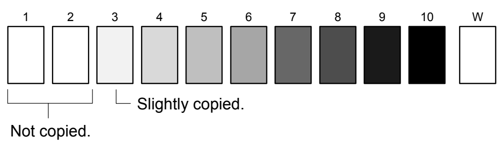
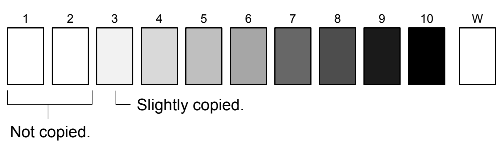
1) Execute SIM 46-1.
2) Select the mode to be adjusted with the exposure mode select key. Set the exposure level to 3 for all adjustment. (Except for the auto mode.)



(1) Mode select key/display lamp
(2) Exposure level select key/ display lamp

Adjustment mode	Exposure mode display lamp	Sharp gray chart adjustment level
Auto mode	Auto lamp ON	"3" is slightly copied.
Manual mode	Manual lamp ON	"3" is slightly copied.
Photo mode	Photo lamp ON	"3" is slightly copied.
Manual T/S mode	Manual lamp/Photo lamp ON	"3" is slightly copied.
Auto T/S mode	Auto lamp/Photo lamp ON	"3" is slightly copied.

3) Make a copy.
   Check the adjustment level (shown in the above table) of the exposure test chart (Sharp Gray Scale).

	Sharp Gray Scale adjustment level
Non toner save mode	
Toner save mode	

(When too bright): Decrease the value displayed on the copy quantity display.

(When too dark): Increase the value displayed on the copy quantity display.

∗ The value can be set in the range of 1 - 99.

3. High voltage adjustment

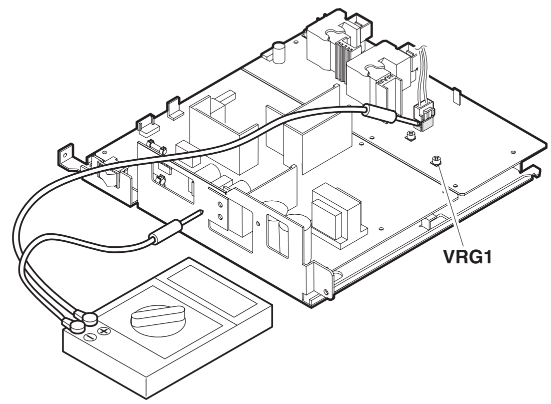
A. Main charger (Grid bias)

Note:

- Use a digital multi meter with internal resistance of 10MΩ or more measurement.
- After adjusting the grid LOW output, adjust the HIGH output. Do not reverse the sequence.

Procedures

1) Set the digital multi meter range to DC700V.
2) Set the positive side of the test rod to the connector CN11-3 (GRID) of high voltage section of the power PWB and set the negative side to the frame ground (power frame).
3) Execute SIM 8-2. (The main charger output is supplied for 30 sec in the grid voltage HIGH output mode.)
4) Adjust the control volume (VRG1) so that the output voltage is 580 ±12V.

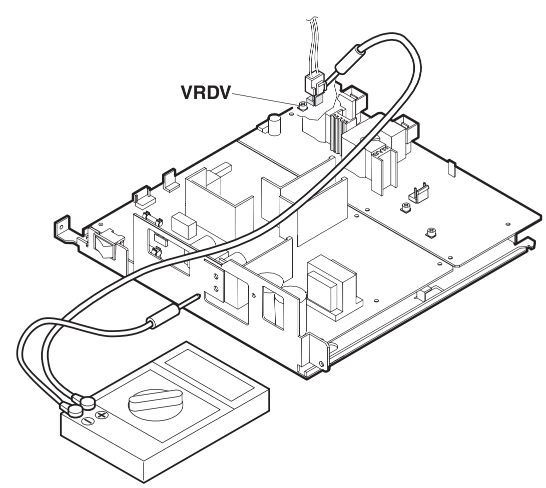


B. DV bias check

Note:
- A digital multi meter with internal resistance of 1GΩ must be use for correct check.
- The adjustment volume is locked, and no adjustment can be made.

Procedures

1) Set the digital multi meter range to DC500V.
2) Set the positive side of the test rod to the connector CN-10-1 (DV BIAS) and set the negative side to the frame ground (power frame).
3) Execute SIM 8-1 to output the developing bias for 30sec, and check that the output is –400 ± 8V.



4. Duplex adjustment

A. Adjusting the paper reverse position in memory for duplex copying

This step adjusts the front surface printing (odd-number pages of a document set) in the S-D mode copying.

That is, it covers the adjustment of the second surface printing mode (image loss at the front edge of an image) in which image data is once stored in memory.

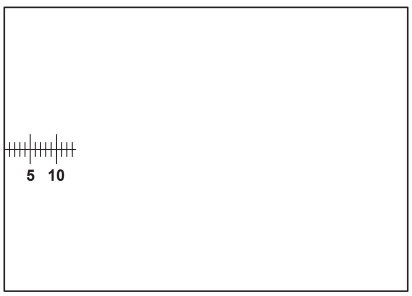
The image data is read, starting from its front end in the document delivery direction (Reference direction of document setting in the OC mode)and stored in memory.

This stored image data is printed starting at the printing start position, in the order of last-stored data to the first-stored data.

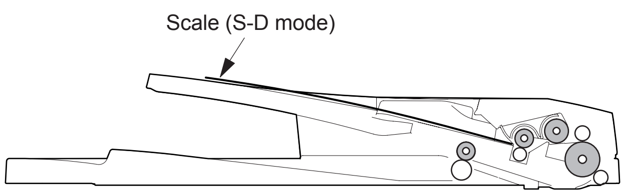
In other words, the front edge image loss of the image can be adjusted by changing the document read end position.

(Adjustment procedure)

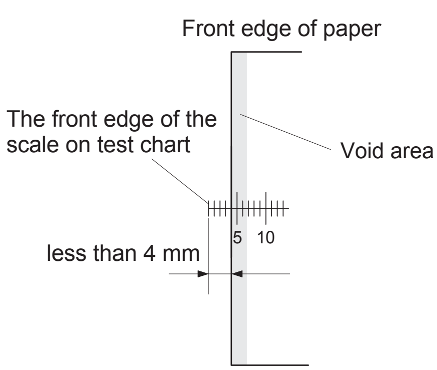
1) Preparing test chart (Draw a scale at the rear end of one side of a sheet of A4 white paper or letter paper)

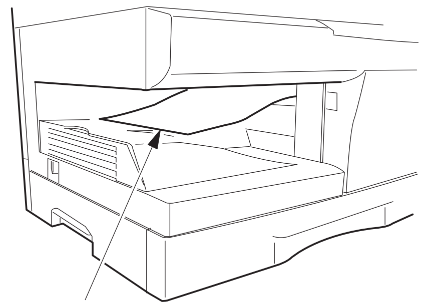


2) Set the test chart so that the scale is positioned as shown below, in the S-D mode.



3) Execute SIM 50-18 to make a copy and check the front edge image loss at the area where the scale is printed.
   Adjust the setting so that the front edge image loss is less than 4.0 mm in the SPF mode.
   An increase of 1 in setting represents an increase of 0.1 mm in image loss.





2nd printing surface where scale is printed (lower side)

B. Adjusting trailing edge void in duplex copy mode

This is the adjustment of the first surface printing mode (rear end void) in duplex copying.

In a duplex copying operation, the paper is delivered starting from the rear end of the first printing surface. It is therefore necessary to make a void area at the rear end on the first printing surface to prevent paper jam at the fusing part.

There are two adjustment modes:

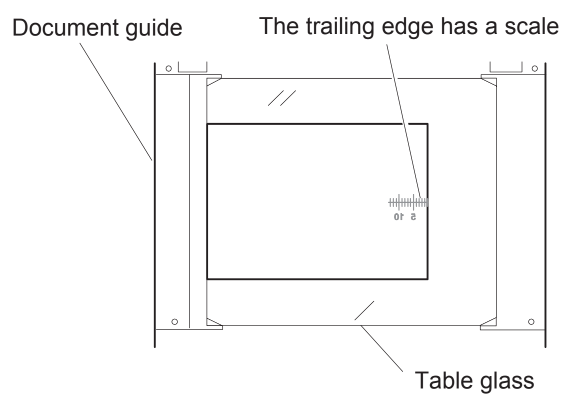
1) Paper trailing edge void quantity 50-19 (TEXT)
   This adjustment is made when the cassette paper size is recognized. The trailing edge void quantity can be adjusted by changing the trailing edge image laser OFF timing.
2) Print start position (Duplex back surface) (SPF) 50-19 (PHOTO)
   The size (length) of a document read from the SPF is detected, the image at the trailing edge of the first printing surface is cut to make a void area. (The adjustment of void quantity at the time when the cassette paper size is not recognized.)

The paper void quantity should be first adjusted before the image cut trailing edge void quantity (SPF) is adjusted.

(Adjustment procedure)

(1) Paper trailing edge void quantity

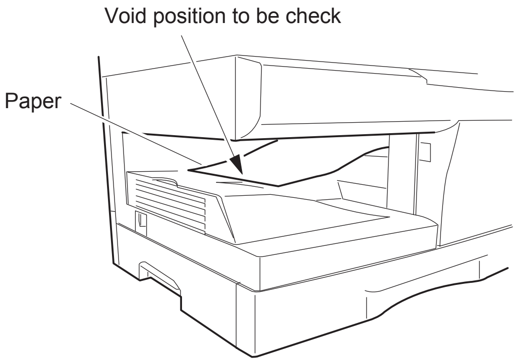
1) Preparing test chart (Draw a scale at the rear end of one side of a sheet of A/4 white paper or letter paper)
2) Set the test chart on the document glass as shown below.



3) Using the user simulation [18], set the paper size of the first cassette.

- Letter paper: 4
- A4 paper: 3

4) Execute SIM 50-19 to turn on the TEXT lamp and make the printing mode in OC-D mode.
   Make a copy of the test chart to check the void area of the scale on the image.

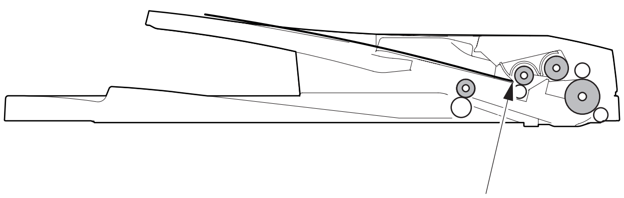


The trailing edge void on the first printing surface is shown above.

Adjust the setting so that the void area is 4 - 5 mm. An increase in 1 of setting represents 0.1 mm in void area.

(2) Print start position (Duplex back surface)

1) Set the test chart so that the scale is positioned as shown below.



2) Execute SIM 50-19 to turn on the PHOTO lamp (on the operation panel) and make the printing mode in the S-D mode.
3) Remove and reinsert the cassette.

Note: Make sure to carry out this step before making a copy during this adjustment.

4) Make a copy and check the void area of the scale on the image.
   Adjust the setting so that the void area is 2 - 4 mm. An increase of 1 in setting represents an increase of 0.1 mm in void area.
   Void position to be checked

5. SPF scan position automatic adjustment

Fold two sheets of A4 paper (white chart) into two, and place them so that they cover the SPF scan glass and the OC glass together, and close the OC cover.

When SIM 53-08 is executed, the current adjustment value is displayed as the initial display.

∗ Default is 50. Adjustment range is 1 – 99. Adjustment unit 1 = about 0.127mm

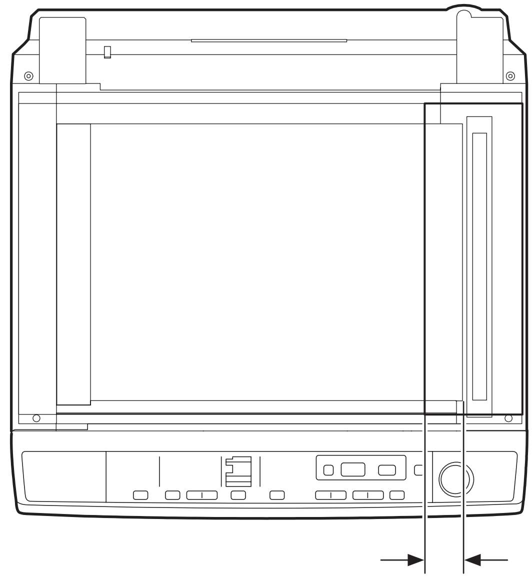
In the case of AUTO, when START key is pressed, the mirror unit scans from the home position to the SPF scan position with the current adjustment value displayed. Then the SPF glass cover edge position is determined from the difference in the CCD output levels of the SPF glass cover edge and the OC side document glass.
If the adjustment is completed normally, the adjusted value is displayed on the 7seg/LCD. If it is terminated abnormally, the following lamp is turned ON.
"JAM lamp": When the operation is canceled by pressing C key during execution, the mirror is returned and "- -" is displayed.

The density select key is used to select the mode.

Mode	Default	LED
SPF scan position auto adjustment	50	AE mode lamp
SPF scan position manual adjustment	50	TEXT mode lamp

Operation

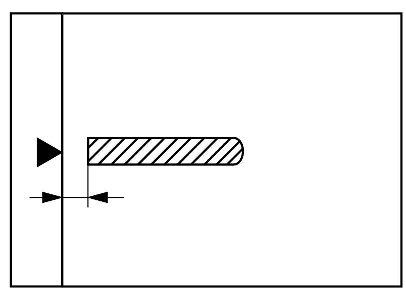
The operation is similar to SIM 46-01. (In MANUAL)



6. SPF mode sub scanning direction magnification ratio adjustment

Note: Before performing this adjustment, be sure to check that the OC mode adjustment in copying has been completed.

1) Put a scale on the original table as shown below, and make a normal copy (100%) on the front and the back surfaces to make a test chart.



Note: Since the printed copy is used as a test chart, put the scale in paralled with the edge lines.

2) Set the test chart on the SPF and make a copy in the normal ratio (100%).
3) Compare the scale image and the actual image.
   If necessary, perform the following adjustment procedures.
4) Execute SIM 48-05.
5) The current sub scanning direction magnification ratio correction value is displayed in two digits on the display section.
6) Enter the set value and press the START key.

Mode	Display item	Default	LED
Sub scan magnification ratio adjustment on the surface of SPF document	SIDE1	50	AE mode lamp

∗ When there is no document in SPF, copy is inhibited.

<Adjustment specification>

Adjustment mode	Spec value	SIM	Set value	Setting range
Sub scanning direction magnification ratio (SPF mode)	At normal: ±1.0%	48-5	Add 1: 0.1% increase Reduce 1: 0.1% decrease	1 – 99

7. Automatic black level correction

a. Cases when the adjustment is required

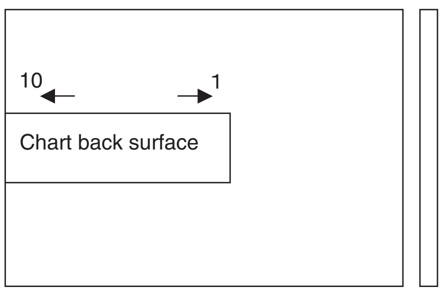
1) When the main PWB is replaced.
2) When the EEPROM in the main PWB is replaced.
3) When "U2" trouble occurs.
4) When repairing or replacing the optical section.

b. Adjustment procedure

Used to acquire the black level target value used for the black level adjustment of white balance.

When SIM 63-02 is executed, the current correction value is displayed in 3 digits of 12bit hexadecimal number.

Place the gray gradation chart (UKOG-0162FCZZ) used as the correction document so that the density 10 (black side) comes on the left side and that the chart is upside down at the center of the plate left center.



When START key is pressed, the mirror base unit scans the chart and calculates the correction value.

After completion of correction, the corrected value is displayed on the display section.

* Default: 0
* If the value is set to the default, operation is made with 0x60.

[10] SIMULATION, TROUBLE CODES

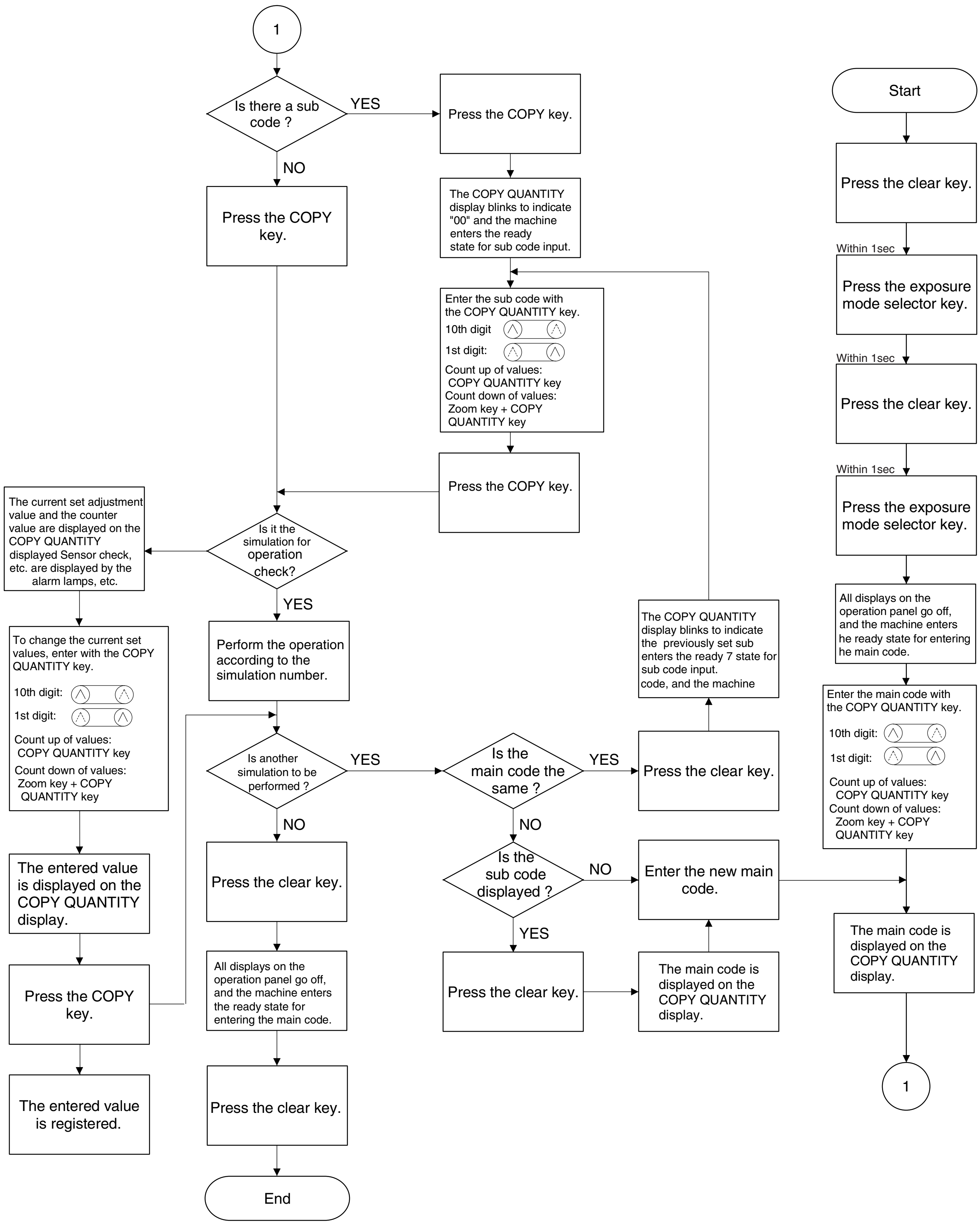
1. Entering the simulation mode

To enter the serviceman simulation mode, press the keys as follows:

Clear → Density select → Clear→ Density select

To cancel the simulation mode, press the clear key.

Flow chart of entering the simulation mode



2. List of simulations

Sim No.	Kind of main code	Sub code	Operation
01	Optical system	01	Mirror scan operation
		02	Mirror home position sensor (MHPS) status display
		06	Aging of mirror scanning
02	SPF Individual load operation	01	Single Paper Feeder (SPF) aging operation
		02	SPF sensor status display
		03	Motor ON
		06	Resist clutch ON (SPF)
		08	SPF paper feed solenoid operation check
05	Lamp ON check	01	Operation panel display check
		02	Fusing lamp, cooling fan operation check
		03	Copy lamp ON
06	Machine individual load operation	01	Paper feed solenoid ON
		02	Resist solenoid ON
07	Aging	01	Warm-up display and aging with jam
		06	Intermittent aging
		08	Shift to copy with the warm-up display.
08	High voltage output check	01	Developing bias
		02	Main charger (Grid high)
		03	Grid voltage (Low)
		06	Transfer charger
09		01	Duplex motor normal rotation operation check <Duplex model only>
		02	Duplex motor reverse operation check <Duplex model only>
		04	Duplex motor rotation speed adjustment <Duplex model only>
10	Toner motor operation check	00	Toner motor aging
14	Trouble reset	00	Cancel of troubles other than U2
16	U2 trouble reset	00	Cancel of U2 trouble
22	Counter display	04	JAM total counter display
		05	Total counter display
		08	SPF counter display
		12	Drum counter display
		14	ROM version display
		16	Duplex counter display <Duplex model only>
		17	Copy counter display
		18	Printer counter display
		19	Scanner mode counter display (AL-2040CS only)
		21	Scanner counter display
		22	SPF JAM counter display
24	Counter clear	01	JAM total counter clear
		04	SPF counter clear
		05	Duplex counter clear <Duplex model only>
		07	Drum counter clear
		08	Copy counter clear
		09	Printer counter clear
		13	Scanner counter clear
		14	SPF JAM total counter clear
		15	Scanner mode counter clear (AL-2040CS only)
25	Main motor ON	01	Main motor operation check (Cooling fan motor rotation check)
		10	Polygon motor ON
26	Various setup	02	SPF setup
		03	Second cassette setup
		04	Machine duplex setup
		06	Destination setup
		07	Machine conditions check
		20	Rear edge void setup
26	Various setup	30	CE mark support control ON/OFF
		38	Cancel of stop at drum life over
		39	Memory capacity check
		40	Polygon motor OFF time setup (Time required for turning OFF after completion of printing)
		42	Transfer ON timing control setup
		43	Side void setup
		62	Energy-save mode copy lamp setup
30	Sensor operation check (Standard provision)	01	Paper sensor status display
41		06	OC cover float detection level adjustment
		07	OC cover float detection margin setting
43	Fusing temperature setup	01	Fusing temperature setting (Normal copy)
		04	Fusing temperature setting in multi copy
		05	Fusing temperature setup in duplex copy
		09	Fusing control setting for postcard-size paper
		11	Fusing temperature setting for postcard-size paper
		14	Fusing start temperature setting
		15	Postcard size paper fusing control cycle sync setting
46	Exposure adjustment	01	Copy density adjustment (300dpi)
		02	Copy density adjustment (600dpi)
		18	Image contrast adjustment (300dpi)
		19	Exposure mode setup
		20	SPF exposure correction
		29	Image contrast adjustment (600dpi)
		30	AE limit adjustment
		31	Image sharpness adjustment
		32	Copier color reproduction setup
48	Magnification ratio correction	01	Front/rear (main scanning) direction and scan (sub scanning) direction magnification ratio adjustment
		05	The current SPF mode sub scan direction magnification ratio is displayed on the LCD/7seg.
49		01	Flash ROM program writing mode
50	Lead edge adjustment	01	Lead edge image position
		06	Copy lead edge position adjustment (SPF)
		10	Center offset adjustment
		12	Document off-center adjustment
		18	Memory reverse position adjustment in duplex copy
		19	Duplex copy rear edge void adjustment
51	Timing adjustment	02	Resist quantity adjustment
53		08	SPF scan position automatic adjustment
61	Laser system operation	03	Polygon motor check (HSYNC output check)
63	Shading	01	Shading check
		02	Black level automatic correction
		12	Light quantity stabilization wait time setting
		13	Light quantity stabilization band setting
64	Self print	01	Self print
67		50	USB receive speed adjustment (USB1.1)

3. Contents of simulations

Input method: Clear key → Exposure Select key → Clear key → Exposure Select key

<table>
<tr><th>Main code</th><th>Sub code</th><th>Content</th></tr>
<tr><td rowspan="3">01</td><td>01</td><td>Mirror scan operation
(Operation/Procedure)
1. When this simulation is executed, the mirror home position is detected.
<table>
<tr><th>Sensor name</th><th>Display lamp</th></tr>
<tr><td>Mirror home position sensor</td><td>OPC drum cartridge replacement lamp</td></tr>
</table>
2. When the START key is pressed, scanning is executed at the speed corresponding to the currently set copy magnification ratio.
The copy magnification ratio can be arbitrarily set with the magnification ratio select key/zoom key.</td></tr>
<tr><td>02</td><td>Mirror home position sensor (MHPS) status display
The mirror home position sensor is monitored, and the sensor status is displayed as follows: (The lamp is lighted while the sensor is ON.)
[Photoconductor drum cartridge replacement lamp]</td></tr>
<tr><td>06</td><td>Aging of mirror scanning
When the PRINT switch is pressed, the mirror base performs full scan at the speed of the set magnification ratio. After 3 sec, the mirror case performs full scan again. These procedures are repeated until the clear key is pressed. (When the PRINT switch is pressed once, the ready lamp keeps OFF.)
The status of the mirror home position sensor is displayed with the photoconductor cartridge lamp. (The lamp is ON when the mirror is at the home position.)
During aging, the copy lamp keeps ON.</td></tr>
<tr><td rowspan="5">02</td><td>01</td><td>Single Paper Feeder (SPF) aging operation
When START key is pressed, the set magnification ratio is obtained. For the SPF, the single surface document transport operation is performed. For the R-SPF, the duplex document transport operation is performed.
Since, however, there is no required operating condition, the operation is not stopped even when a JAM occurs.
The magnification ratio change and the operation status display are Similar to SIM 1-01.</td></tr>
<tr><td>02</td><td>SPF sensor status display
ON/OFF of the sensors in the SPF can be checked with the following lamps.
<table>
<tr><th>Display</th><th>Sensor</th></tr>
<tr><td>Developer cartridge replacement lamp</td><td>Document set detection (SPID)</td></tr>
<tr><td>Jam lamp</td><td>SPF document transport detection (SPPD)</td></tr>
</table></td></tr>
<tr><td>03</td><td>Motor ON
(Operation/Procedure)
When the start key is pressed, the SPF motor rotates for 10 sec at the speed corresponding to the currently set magnification ratio.</td></tr>
<tr><td>06</td><td>Resist clutch ON (SPF)
(Operation/Procedure)
When the start key is pressed, the RSPF resist clutch (SRRC) repeats ON (500 ms) and OFF (500 ms) 20 times.</td></tr>
<tr><td>08</td><td>SPF paper feed solenoid operation check
The SPF paper feed solenoid (SPUS) is turned ON for 500msec and OFF for 500msec. This procedure is repeated 20 times.</td></tr>
<tr><td rowspan="2">05</td><td>01</td><td>Operation panel display check
• When the PRINT switch is pressed, all LEDs (including 7-segment LEDs) on the operation panel are lighted. (LED check mode)
• When 1Up key is pressed, the LEDs on the operation panel are lighted individually from the top left to the bottom right in sequence. After completion of all individual lighting, all LEDs are lighted simultaneously. (The 7-segment LED lights the three-digit sections at the same time.)
Individual lighting frequency ON: 300ms, OFF: 20ms
• When the CLEAR key is pressed, this simulation is terminated.
• When the PRINT switch is pressed in the LED check mode, the machine enters the Key input check mode.
“Key input check mode”
When the machine enters the Key input check mode, the value display section indicates “– – –.” Every time any key on the operation panel is pressed, the entered value is added and displayed on the value display section. However, the keys that were pressed once are not counted again.
• When the PRINT switch is pressed, the entered value is added and displayed for 3 sec and all the LEDs are lighted. (LED lighting check mode)
(Note for Key input check mode)
• Press the PRINT switch at the end. (If it is pressed in the middle of the process, the entered value up to that moment is displayed for 3 sec and the machine enters the LED lighting check mode. (ALL the LEDs are lighted.))
• Multiple key inputs are ignored.</td></tr>
<tr><td>02</td><td>Fusing lamp, cooling fan operation check
When the PRINT switch is pressed, the fusing lamp repeats operations of 500ms-ON and 500ms-OFF 5 times. During that time, the cooling fan motor rotates.</td></tr>
</table>

Main code	Sub code	Content
05	03	Copy lamp ON (Operation/Procedure) When the START key is pressed, the copy lamp is lighted for 5 sec.
06	01	Paper feed solenoid ON (Operation/Procedure) When the START key is pressed, the paper feed solenoid selected by the tray select key repeats ON (500ms) and OFF (500ms) 20 times.
	02	Resist solenoid ON (Operation/Procedure) When the START key is pressed, the resist solenoid (RRS) repeats ON (500ms) and OFF (500ms) 20 times.
07	01	Warm-up display and aging with jam (Operation/Procedure) 1. When the simulation is executed, warming up is started. 2. Warm-up time is counted and displayed every second on the copy quantity display. 3. After completion of warm-up, the time count is stopped and the ready lamp is lighted. 4. Press the clear key to clear the warm-up time display, set the copy quantity, and press the START key, and the machine will copy the set quantity repeatedly. This simulation is canceled by turning off the power or executing any simulation which performs hardware reset.
	06	Intermittent aging (Operation/Procedure) 1. When the simulation is executed, warming up is started. 2. After completion of warm-up, the ready lamp is lighted. 3. Set the copy quantity and press the START key, and the machine will copy the set quantity repeatedly. 4. After 3 sec of the interval time from completion of copying the set quantity, the machine will resume copying. 5. The above operation 4 is repeated. This simulation is canceled by turning off the power or executing any simulation which performs hardware reset.
	08	Shift to copy with the warm-up display. When the simulation code is entered, warming-up is started. The warming-up time is counted from 0 in the increment of 1 sec. The operation during count-up process is as stated below. When C key is pressed, the operation is terminated. (The 7-seg display indicates the sub code.) Warming-up operation is continued. After completion of warming-up, counting is terminated. (This is similar to SIM 07-01 without the aging function.
08	01	Developing bias (Operation/Procedure) When the START key is pressed, the developing bias is outputted for 30 sec.
	02	Main charger (Grid high) (Operation/Procedure) When the START key is pressed, the main charger output is supplied for 30 sec in the grid voltage HIGH mode.
	03	Grid voltage (Low) (Operation/Procedure) When the START key is pressed, the main charger output is supplied for 30 sec in the grid voltage LOW mode.
	06	Transfer charger (Operation/Procedure) When the START key is pressed, the transfer charger output is supplied for 30 sec.
09	01	Duplex motor normal rotation operation check <Duplex model only> The duplex motor is rotated in the normal direction (paper exit direction) for 30 sec. After completion of the process, the display returns to the sub code input standby state.
	02	Duplex motor reverse operation check <Duplex model only> The duplex motor is driven in the reverse direction for 30 sec. After completion of the process, the display returns to the sub code input standby state.
	04	Duplex motor rotation speed adjustment <Duplex model only> When this simulation is executed, the current set value is displayed. Enter the adjustment value with UP/UP key, and press START key to save the entered value. The display returns to the sub code input standby mode. When the set value is increased, the speed is increased, When the set value is decreased, the speed is decreased. Setup range: 1 – 13 Default: 6
10	00	Toner motor aging (Operation/Procedure) When the START key is pressed, the toner motor output is supplied for 30 sec.
14	00	Cancel of troubles other than U2 (Operation/Procedure) After canceling the trouble, the simulation is also automatically canceled.
16	00	Cancel of U2 trouble (Operation/Procedure) 1. When the START key is pressed, the EEPROM total counter check sum is rewritten and the trouble is canceled. 2. After canceling the trouble, the simulation is also automatically canceled.

<table>
<tr><th>Main code</th><th>Sub code</th><th>Content</th></tr>
<tr><td rowspan="12">22</td><td>04</td><td>JAM total counter display
The display method is the same as the total count value display.
<Display example: 12345>
012 → Blank → 345 → Blank → 012
0.7s 0.3s 0.7s 1.0s 0.7s</td></tr>
<tr><td>05</td><td>Total counter display
The total count value is displayed in 3 digits X 2 times repeatedly.</td></tr>
<tr><td>08</td><td>SPF counter display
The display method is the same as the total count value display.</td></tr>
<tr><td>12</td><td>Drum counter display
The display method is the same as the total count value display.</td></tr>
<tr><td>14</td><td>ROM version display
The main code and the sub code of the ROM version is displayed on the value display section in 2 digits alternately.
The display method is the same as the total count value display.</td></tr>
<tr><td>16</td><td>Duplex counter display <Duplex model only>
The display method is the same as the total count value display.</td></tr>
<tr><td>17</td><td>Copy counter display
The display method is the same as the total count value display.</td></tr>
<tr><td>18</td><td>Printer counter display
The display method is the same as the total count value display.</td></tr>
<tr><td>19</td><td>Scanner mode counter display (AL-2040CS only)
The display method is the same as the total count value display.</td></tr>
<tr><td>21</td><td>Scanner counter display
The display method is the same as the total count value display.</td></tr>
<tr><td>22</td><td>SPF JAM counter display
The display method is the same as the total count value display.</td></tr>
<tr><td></td><td></td></tr>
<tr><td rowspan="9">24</td><td>01</td><td>JAM total counter clear
When the PRINT switch is pressed, the JAM total count value is reset to 0.</td></tr>
<tr><td>04</td><td>SPF counter clear
When the PRINT switch is pressed, the SPF count value is reset to 0.</td></tr>
<tr><td>05</td><td>Duplex counter clear <Duplex model only>
When START key is pressed, the duplex count value is set to 0.</td></tr>
<tr><td>07</td><td>Drum counter clear
When the PRINT switch is pressed, the drum count value is reset to 0.</td></tr>
<tr><td>08</td><td>Copy counter clear
When the PRINT switch is pressed, the copy count value is reset to 0.</td></tr>
<tr><td>09</td><td>Printer counter clear
When the PRINT switch is pressed, the printer count value is reset to 0.</td></tr>
<tr><td>13</td><td>Scanner counter clear
When the PRINT switch is pressed, the scanner count value is reset to 0.</td></tr>
<tr><td>14</td><td>SPF JAM total counter clear
When the PRINT switch is pressed, the SPF JAM total count value is reset to 0.</td></tr>
<tr><td>15</td><td>Scanner mode counter clear (AL-2040CS only)
When the PRINT switch is pressed, the scanner mode counter is reset to 0.</td></tr>
<tr><td rowspan="2">25</td><td>01</td><td>Main motor operation check (Cooling fan motor rotation check)
When the PRINT switch is pressed, the main motor (as well as the duplex motor in the duplex model) is operated for 30 sec. If the developing unit is installed at that time, the developing bias, the main charger, and the grid are outputted together in order to avoid toner consumption. Since, in this case, laser discharge is required when stopping the motor, the polygon motor is rotated at the same time. If the developing unit is not installed, the above high voltage is not outputted and only the motor is rotated.
☆ : Do not execute this simulation by forcibly turning ON the door ON/OFF switch.</td></tr>
<tr><td>10</td><td>Polygon motor ON
(Operation/Procedure)
When the START key is pressed, the polygon motor is operated for 30 sec.</td></tr>
<tr><td>26</td><td>02</td><td>SPF setup
When this simulation is executed, the current setup of the SPF code number is displayed. Enter the code number corresponding to the SPF and press the PRINT switch to enable the setup.
<table>
<tr><th>Code number</th><th>SPF</th></tr>
<tr><td>0</td><td>SPF not installed</td></tr>
<tr><td>1</td><td>SPF installed</td></tr>
<tr><td>2</td><td>RSPF installed</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>Main code</th><th>Sub code</th><th>Content</th></tr>
<tr><td>26</td><td>03</td><td>Second cassette setup
(Operation/Procedure)
1. When this simulation is executed, the currently set code number of the second cassette is displayed.
2. Enter the code number and press the start key. The setting is changed.
<table>
<tr><th>Code number</th><th>Second cassette</th></tr>
<tr><td>0</td><td>Without second cassette</td></tr>
<tr><td>1</td><td>With second cassette</td></tr>
</table></td></tr>
<tr><td></td><td>04</td><td>Machine duplex setup
(Operation/Procedure)
1. When this simulation is executed, the currently set duplex code number is displayed.
2. Enter the code number corresponding to the duplex and press the ENTER key, and the setup will be changed.
<table>
<tr><th>Code number</th><th>Duplex</th></tr>
<tr><td>0</td><td>Without Duplex</td></tr>
<tr><td>1</td><td>With Duplex</td></tr>
</table></td></tr>
<tr><td></td><td>06</td><td>Destination setup
When this simulation is executed, the current setup of the destination code number is displayed. Enter the code number corresponding to the destination and press the PRINT switch to enable the setup.
<table>
<tr><th>Code number</th><th>Destination</th></tr>
<tr><td>0</td><td>Inch series</td></tr>
<tr><td>1</td><td>AB series</td></tr>
</table></td></tr>
<tr><td></td><td>07</td><td>Machine conditions check
When this simulation is executed, the current machine setup is displayed.
<table>
<tr><th>CPM</th><th>Copy quantity display</th></tr>
<tr><td>20 cpm</td><td>20</td></tr>
</table></td></tr>
<tr><td></td><td>20</td><td>Rear edge void setup
When this simulation is executed, the current setup of the rear edge void code number is displayed. Enter the code number corresponding to the rear edge void and press the PRINT switch to enable the setup.
<table>
<tr><th>Code number</th><th>Rear edge void setup</th></tr>
<tr><td>0</td><td>Rear edge void not provided</td></tr>
<tr><td>1</td><td>Rear edge void provided * Default</td></tr>
</table></td></tr>
<tr><td></td><td>30</td><td>CE mark support control ON/OFF
When this simulation is executed, the current setup of the CE mark support code number is displayed. Enter the code number corresponding to the CE mark support setup and press the PRINT switch to enable the setup.
<table>
<tr><th>Code number</th><th>CE mark support setup</th></tr>
<tr><td>0</td><td>CE mark support control OFF * Default (100V series)</td></tr>
<tr><td>1</td><td>CE mark support control ON</td></tr>
</table>
The default for CE-support 200V series is “1.”</td></tr>
<tr><td></td><td>38</td><td>Cancel of stop at drum life over
When this simulation is executed, the current setup of the code number is displayed. Enter the code number and press the PRINT switch to enable the setup.
<table>
<tr><th>Code number</th><th>Setup</th></tr>
<tr><td>0</td><td>Stop at drum life over * Default (AL model)</td></tr>
<tr><td>1</td><td>Cancel of stop at drum life over</td></tr>
</table></td></tr>
<tr><td></td><td>39</td><td>Memory capacity check
When this simulation is executed, the current memory capacity is displayed.
<table>
<tr><th>Code number</th><th>Setup</th></tr>
<tr><td>8</td><td>8 Mbyte</td></tr>
<tr><td>16</td><td>16 Mbyte</td></tr>
</table></td></tr>
<tr><td></td><td>40</td><td>Polygon motor OFF time setup (Time required for turning OFF after completion of printing)
When this simulation is executed, the current setup of the code number is displayed. Enter the code number and press the PRINT switch to enable the setup.
<table>
<tr><th>Code number</th><th>Setup</th></tr>
<tr><td>0</td><td>0 sec</td></tr>
<tr><td>1</td><td>30 sec * Default</td></tr>
<tr><td>2</td><td>60 sec</td></tr>
<tr><td>3</td><td>90 sec</td></tr>
</table></td></tr>
</table>

Main code	Sub code	Content
26	42	Transfer ON timing control setup (Operation/Procedure) 1. When this simulation is executed, the currently set code number is displayed. 2. Enter the code number and press the START key, and the setting will be changed. (For any number different from the following ones, the default time is automatically set.)

Code number	Setting	Code number	Setting
0	Default (236 msec)	11	Default (236 msec)
1	−20 msec	12	+2 msec
2	−18 msec	13	+4 msec
3	−16 msec	14	+6 msec
4	−14 msec	15	+8 msec
5	−12 msec	16	+10 msec
6	−10 msec	17	+12 msec
7	−8 msec	18	+14 msec
8	−6 msec	19	+16 msec
9	−4 msec	20	+18 msec
10	−2 msec	21	+20 msec

Main code	Sub code	Content
	43	Side void setup (Operation/Procedure) 1. When this simulation is executed, the currently set code number of the side void amount is displayed. 2. Enter the code number and press the start key. The setting is changed.

Code number	Setting
0	0 mm
1	0.5 mm
2	1.0 mm
3	1.5 mm
4	2.0 mm * Default
5	2.5 mm
6	3.0 mm
7	3.5 mm
8	4.0 mm
9	4.5 mm
10	5.0 mm

Main code	Sub code	Content
	62	Energy-save mode copy lamp setup Used to set half-ON (50%)/OFF of the copy lamp in the pre-heat mode. When this simulation is executed, the current setup of the code number is displayed. Enter the code number and press the PRINT switch to enable the setup.

Code number	Setup
0	Copy lamp OFF
1	Copy lamp half-ON (50%) * Default

Main code	Sub code	Content
30	01	Paper sensor status display Indicates the paper sensor status using the lamps on the operation panel.

Sensor name	Display lamp
Before-resist paper sensor (PPD1)	Developer cartridge replacement lamp
Fusing section paper sensor (PPD2)	JAM lamp
Paper exit sensor (POD)	Photoconductor cartridge replacement lamp
2nd CS paper sensor (PPD3)	2nd cassette lamp
New drum cartridge sensor (PUIS)	Zoom lamp

Main code	Sub code	Content
41	06	OC cover float detection level adjustment When this simulation is executed, the current set value is displayed. When ENTER/START key is pressed, the mirror base unit moves to the SPF scanning position and the OC cover float detection level (number of pixels between black lines) is acquired and displayed. The value (0000) is displayed on the 7seg in 2 digits for each. When the mirror base unit returns to the home position, the acquired value is displayed. If the value is not acquired, an error is displayed as shown below. (Default: 0) The status display is as shown below. The JAM lamp is lighted. (The 7seg display remains to the original value.) Note that the OC cover must be closed when executing this simulation. * When the value is 0, float detection is not performed in a normal job. When C key is pressed, the display returns to the sub code input standby state.

<table>
<tr><th>Main code</th><th>Sub code</th><th>Content</th></tr>
<tr><td>41</td><td>07</td><td>OC cover float detection margin setting
For the number of pixels between black markers on the SPF scanning position saved in SIM 41-06 (OC cover float detection level adjustment), if the number of pixels between the markers when processing float detection is less than the number of pixels set with this simulation, it is judged as the float error.
In addition, if the set value of this simulation is 0, no float error occurs.
When this simulation is executed, the current set value is displayed.
Enter the adjustment value with UP/UP key, and press START key to save the entered value. The display returns to the sub code input standby mode.
Set range: 0 – 99
Default: 30 (30 pixels)</td></tr>
<tr><td>43</td><td>01</td><td>Fusing temperature setting (Normal copy)
Used to set the fusing temperature of 3rd or later sheet. (For 1st and 2dns sheets, SIM 43-14 is used.)
When this simulation is executed, the currently set code number is displayed.
Enter the code number with UP/UP key and press START key. The entered value is saved and the display returns to the sub code input standby state.
The density select key is used to select the mode. The set value of the selected mode is displayed on the 7seg.
<table>
<tr><th>Code number</th><th>Set temperature (°C)</th></tr>
<tr><td>0</td><td>170</td></tr>
<tr><td>1</td><td>175</td></tr>
<tr><td>2</td><td>180</td></tr>
<tr><td>3</td><td>185</td></tr>
<tr><td>4</td><td>190</td></tr>
<tr><td>5</td><td>195 (* Default)</td></tr>
<tr><td>6</td><td>200</td></tr>
<tr><td>7</td><td>205</td></tr>
<tr><td>8</td><td>210</td></tr>
</table>
<table>
<tr><th>Mode</th><th>Lamp ON</th></tr>
<tr><td>Main cassette paper feed & 2nd cassette paper feed</td><td>AE mode lamp</td></tr>
<tr><td>Manual paper feed</td><td>TEXT mode lamp</td></tr>
</table>
∗ The cassette feed and the manual feed are controlled similarly.</td></tr>
<tr><td></td><td>04</td><td>Fusing temperature setting in multi copy
From the 20th sheet and later, the fusing temperature is changed over from the level set with SIM 43-1 to the level set with this simulation.
When this simulation is executed, the currently set code number is displayed.
Enter the code number with UP/UP key and press START key. The entered value is saved and the display returns to the sub code input standby state.
The density select key is used to select the mode. The set value of the selected mode is displayed on the 7seg.
<table>
<tr><th>Code number</th><th>Set temperature (°C)</th></tr>
<tr><td>0</td><td>165</td></tr>
<tr><td>1</td><td>170</td></tr>
<tr><td>2</td><td>175</td></tr>
<tr><td>3</td><td>180</td></tr>
<tr><td>4</td><td>185</td></tr>
<tr><td>5</td><td>190</td></tr>
</table>
<table>
<tr><th>Mode</th><th>Lamp ON</th><th>Default</th></tr>
<tr><td>Main cassette paper feed & 2nd cassette paper feed</td><td>AE mode lamp</td><td>3</td></tr>
<tr><td>Manual paper feed</td><td>TEXT mode lamp</td><td>3</td></tr>
<tr><td>Target temperature setting for small-size paper (A5/B5/INV)</td><td>PHOTO mode lamp</td><td>1</td></tr>
</table>
∗ The cassette feed and the manual feed are controlled similarly.</td></tr>
<tr><td></td><td>05</td><td>Fusing temperature setup in duplex copy
In duplex copy, this setup value is added to the fusing temperature of single copy. When this simulation is executed, the current setup of the code number is displayed. Enter the code number and press the PRINT switch to enable the setup.
<table>
<tr><th>Code number</th><th>Temperature shift (°C)</th></tr>
<tr><td>0</td><td>±0°C * Default</td></tr>
<tr><td>1</td><td>−8°C</td></tr>
<tr><td>2</td><td>−6°C</td></tr>
<tr><td>3</td><td>−4°C</td></tr>
<tr><td>4</td><td>−2°C</td></tr>
<tr><td>5</td><td>±0°C</td></tr>
<tr><td>6</td><td>+2°C</td></tr>
<tr><td>7</td><td>+4°C</td></tr>
<tr><td>8</td><td>+6°C</td></tr>
<tr><td>9</td><td>+8°C</td></tr>
</table></td></tr>
</table>

Main code	Sub code	Content
43	09	Fusing control setting for postcard-size paper

When this simulation is executed, the currently set code number is displayed.
Enter the code number and press START key to save the setting.

Code number	Temperature shift (°C)
0	Cancel * Default
1	Setting

Main code	Sub code	Content
43	11	Fusing temperature setting for postcard-size paper

When this simulation is executed, the current set value is displayed.
Press UP/UP key to select the setting, and press START key to write into the EPROM. The display returns to the sub code input standby mode.

Code number	Temperature shift (°C)
0	160
1	165
2	170
3	175
4	180
5	185
6	190
7	195 * Default
8	200

Main code	Sub code	Content
43	14	Fusing start temperature setting

The fusing temperature when starting printing (first – second sheet) is set.
When this simulation is executed, the currently set code number is displayed.
When the code number is entered with UP/UP key and the START key is pressed, setting is changed over.

Code number	Set temperature (°C)
0	160
1	165
2	170
3	175
4	180
5	185
6	190
7	195 (* Default)
8	200

Mode	Lamp ON
Main cassette paper feed & 2nd cassette paper feed	AE mode lamp
Manual paper feed	TEXT mode lamp

∗ The cassette feed and the manual feed are controlled similarly.

Main code	Sub code	Content
43	15	Postcard size paper fusing control cycle sync setting

When this simulation is executed, the currently set code number is displayed.
Change the setting with UP/UP key, and press START key to write the setting to the EEPROM. (Setting range: 0 – 20, default: 0)

∗ When set to "0," the setting is canceled and the fusing temperature control and the paper pass timing are not synchronized. The conventional control (control same as the other paper) is performed.

∗ When set to "1" – "20," the postcard pass is synchronized with the fusing temperature control cycle, providing stable fusing performance. However, CPM is reduced.

Code number	Sync setting	Fusing heater lamp OFF timing temperature
0	Cancel	– (* Default)
1	Setting	+0.5°C
:		:
6		+3.0°C
:		:
20		+10.0°C

∗ When set to "1" – "20," if "Set value x 0.5°C + Temperature control level," the fusing heater lamp is turned OFF.

<table>
<tr><th>Main code</th><th>Sub code</th><th>Content</th></tr>
<tr><td>46</td><td>01</td><td>Copy density adjustment (300dpi)
Used to set the copy density in each mode.
(Operating procedure)
When this simulation is executed, warm-up and shading operations are performed and the current setup is displayed in two digits (default: 50).
Change the setup value with the copy quantity keys. Press the PRINT switch and a copy is made according to the new setup. The greater the setup value is, the darker the copy is. The smaller the setup value is, the brighter the copy is. Only EXP.3 copy is made in this simulation. When set to a darker level, Exp.1 and Exp.5 copies also become darker. When set to a brighter level, Exp.1 and Exp.5 copies also become brighter. Press the CLEAR key to save the setup and exit from the simulation mode.
Use the copy mode select key to select a copy mode. The setup value of the selected copy mode is displayed on the copy quantity display. (adjustment range: 1 – 99)
<table>
<tr><th>Copy mode</th><th>Display lamp</th></tr>
<tr><td>AE mode (300dpi)</td><td>AE mode lamp</td></tr>
<tr><td>TEXT mode (300dpi)</td><td>TEXT mode lamp</td></tr>
<tr><td>PHOTO mode</td><td>PHOTO mode lamp</td></tr>
<tr><td>TS mode (TEXT) (300dpi)</td><td>TEXT mode lamp & PHOTO mode lamp</td></tr>
<tr><td>TS mode (AE) (300dpi)</td><td>AE mode lamp & PHOTO mode lamp</td></tr>
</table></td></tr>
<tr><td></td><td>02</td><td>Copy density adjustment (600dpi)
Used to set the copy density in each mode.
(Operation/Procedure)
When this simulation is executed, the machine performs warm-up and shading, and the current setup value is displayed in two digits. (Default: 50)
Use the copy quantity key to change the setup value, and press the PRINT switch to make a copy with the new setup.
The greater the setup value is, the darker the copy is, and vise versa. Only EXP.3 copy is made. If it is set to a darker density, EXP.1 and EXP.5 copies also become darker. If it is set to a brighter density, they also become brighter.
When the CLEAR key is pressed, the entered setup value is saved and the simulation is terminated.
Any copy mode can be selected with the copy mode select key. The setup value of the selected copy mode is displayed on the copy quantity display. (Setup range: 1 – 99)
<table>
<tr><th>Copy mode</th><th>Display lamp</th></tr>
<tr><td>AE mode (600dpi)</td><td>AE mode lamp</td></tr>
<tr><td>TEXT mode (600dpi)</td><td>TEXT mode lamp</td></tr>
<tr><td>PHOTO mode</td><td>PHOTO mode lamp</td></tr>
<tr><td>TS mode (TEXT) (600dpi)</td><td>TEXT mode lamp & PHOTO mode lamp</td></tr>
<tr><td>TS mode (AE) (600dpi)</td><td>AE mode lamp & PHOTO mode lamp</td></tr>
</table></td></tr>
<tr><td></td><td>18</td><td>Image contrast adjustment (300dpi)
Used to set the image contrast in each mode.
(Operating procedure)
When this simulation is executed, warm-up and shading operations are performed and the current setup value is displayed in two digits. (Default: 50)
Change the setup value with the copy quantity keys. Press the PRINT switch and a copy is made according to the new setup. The greater the setup value is, the higher the contrast is. The smaller the setup value is, the lower the contrast is. Though only EXP.3 copy is made in this simulation, the contrast levels in EXP.1 and EXP.5 are also changed. Press the CLEAR key to save the setup and exit from the simulation mode.
Use the copy mode select key to select a copy mode. The setup value of the selected copy mode is displayed on the copy quantity display.
(adjustment range: 1 – 99)
<table>
<tr><th>Copy mode</th><th>Display lamp</th></tr>
<tr><td>AE mode (300dpi)</td><td>AE mode lamp</td></tr>
<tr><td>TEXT mode (300dpi)</td><td>TEXT mode lamp</td></tr>
<tr><td>PHOTO mode</td><td>PHOTO mode lamp</td></tr>
<tr><td>TS mode (TEXT) (300dpi)</td><td>TEXT mode lamp & PHOTO mode lamp</td></tr>
<tr><td>TS mode (AE) (300dpi)</td><td>AE mode lamp & PHOTO mode lamp</td></tr>
</table></td></tr>
</table>

Main code	Sub code	Content
46	19	Exposure mode setup

46 – 19 Exposure mode setup

<γ table setup or AE operation mode setup>
When this simulation is executed, the current setup of the gamma table code number is displayed. Enter the code number corresponding to desired gamma table, and press the PRINT switch or the copy mode select key to enable the setup.

Code number	γ table
1	Image quality priority mode
2	Toner consumption priority mode * Default

When the copy mode select key is pressed during setup of the gamma table, the mode is switched to the AE operation setup mode and the current setup of the AE operation mode code number is displayed. (Default: 0) Enter the code number corresponding to your desired AE operation mode, and press the PRINT switch or the copy mode select key to switch the setup. (When the copy mode select key is pressed, the mode is returned to the gamma table setup mode.)

Code number	AE operation mode
0	Fixed process * Default
1	Real time process

<PHOTO image process setting>
When the copy mode select key is pressed in the AE operation mode setting, the mode is changed to the PHOTO image process setting and the currently set code number of the PHOTO image process setting is displayed. (Default: 0)
When the code number corresponding to the desired Photo image process setting is entered and the copy mode select key is pressed, the mode is changed over.

Mode	Code number	Setting content	Display lamp
γ	1	Image priority mode	OFF
	2	Toner consumption priority mode * Default	
AE	0	Lead edge stop * Default	AE ON
	1	Real time process	
PHOTO	1	Error diffusion process * Default	PHOTO ON
	2	Dither process	

46 – 20 SPF exposure correction

Used to adjust the exposure correction quantity in the SPF mode by adjusting the differential of Vref voltage for the OC mode.
(Operating procedure)
When this simulation is executed, the current setup is displayed. Enter the adjustment value with the 10-key and press the PRINT key to enable the setup and make a copy.
When the CLEAR key is pressed, the entered value is saved and the simulation mode is terminated.
* The greater the value is the darker the exposure is.
The smaller the value is, the brighter the exposure is.

Mode	Display lamp
SPF	TEXT mode lamp

46 – 29 Image contrast adjustment (600dpi)

Used to set the contrast in each mode.
(Operation/Procedure)
When this simulation is executed, the machine performs warm-up and shading, and the current setup value is displayed in two digits. (Default: 50)
Use the copy quantity keys to change the setup value, and press the PRINT switch to make a copy with the new setup.
The greater the setup value is, the greater the contrast is, and vise versa. Only EXP.3 copy is made, however, EXP.1 contrast and EXP.5 contrast are also changed accordingly.
When the CLEAR key is pressed, the entered setup value is saved and the simulation is terminated.
Any copy mode can be selected with the copy mode select key. The setup value of the selected copy mode is displayed on the copy quantity display.
(Setup range: 1 – 99)

Copy mode	Display lamp
AE mode (600dpi)	AE mode lamp
TEXT mode (600dpi)	TEXT mode lamp
PHOTO mode	PHOTO mode lamp
TS mode (TEXT) (600dpi)	TEXT mode lamp & PHOTO mode lamp
TS mode (AE) (600dpi)	AE mode lamp & PHOTO mode lamp

Main code	Sub code	Content
46	30	AE limit adjustment

AE and the limit value of AE (toner save) are set.
Setting is changed. When START key is pressed, the set content is written into the EEPROM and the display returns to the sub code input standby mode.
When UP key is pressed, the setting is changed over. (Set range: 0 – 31, Default: 0)
Each mode can be selected by pressing the density select key.
For UP keys, only 1UP key is valid. (10UP key is invalid.)

Mode	Display lamp
AE limit value	AE mode lamp
AE (toner save) limit value	TEXT mode lamp

<Remark>
When SIM 26-06 is changed or SIM 46-19 automatic exposure mode is changed, this setting is also changed to the default value.

Main code	Sub code	Content
46	31	Image sharpness adjustment

Used to adjust the clear/shading-off of an image in each mode.
(Operating procedure)
When this simulation is executed, warm-up and shading operations are performed and the current setup value is displayed. (Default: 1)
Change the setup value with the copy quantity keys. Press the PRINT switch and a copy is made according to the new setup.
When the clear key is pressed, the entered setup value is saved and the simulation is terminated.

Setup value	Image quality
0	Shading off
1	Standard * Default
2	Clear

Any desired copy mode can be selected with the copy mode select key. The code number of the selected copy mode is displayed on the copy quantity display.

Copy mode	Display lamp
AE mode	AE mode lamp
TEXT mode	TEXT mode lamp
PHOTO mode	PHOTO mode lamp
TS mode (TEXT)	TEXT mode lamp & PHOTO mode lamp
TS mode (AE)	AE mode lamp & PHOTO mode lamp

Main code	Sub code	Content
46	32	Copier color reproduction setup

Used to set color reproduction for each mode. Colors which are easily copied or which are not easily copied are selected.

Setup value	Easy-to-copy colors	Difficult-to-copy colors
0	Purple/Blue/Red	Yellow/Green/Light blue
1	Light blue/Green/Blue	Purple/Red/Yellow
2	Yellow/Red/Green	Blue/Light blue/Purple

* This setup does not affect black-and-white copies.

(Operating procedure)
When this simulation is executed, the current setup of the code number for each copy mode is displayed. (Default: 0)
Change the setup value with the copy quantity keys and press the Print switch. A copy will be made according to the setup. At that time, the color component used for copying is changed.
When the clear key is pressed, the entered code number is saved and the simulation mode is terminated.
Any desired copy mode can be selected with the copy mode select key. The selected copy mode is displayed on the copy quantity display.

Code number	Component of use
0	Green * Default
1	Red
2	Blue

Copy mode	Display lamp
AE mode (including TS)	AE mode lamp
TEXT mode (including TS)	TEXT mode lamp
PHOTO mode	PHOTO mode lamp

<table>
<tr><th>Main code</th><th>Sub code</th><th>Content</th></tr>
<tr><td>48</td><td>01</td><td>Front/rear (main scanning) direction and scan (sub scanning) direction magnification ratio adjustment
The magnification ratios in the main scanning direction (front/rear) and in the sub scanning direction are adjusted.
Enter the adjustment value with 10-key, and press START key to save the entered value, and make a copy. (When the set value is increased by 1, the magnification ratio is increased by 0.1%.)
The adjustment mode can be selected with the density select key. (Adjustment range: 1 – 99, Default: 50)
<table>
<tr><th>Mode</th><th>Display lamp</th><th>Default</th></tr>
<tr><td>Main scanning direction magnification ratio</td><td>TEXT mode lamp</td><td>50</td></tr>
<tr><td>OC mode sub scanning direction magnification ratio</td><td>PHOTO mode lamp</td><td>50</td></tr>
</table></td></tr>
<tr><td></td><td>05</td><td>The current SPF mode sub scan direction magnification ratio is displayed on the LCD/7seg.
When START key is pressed, the entered data are obtained and saved into the EEPROM, and a copy is made. (When the set value is changed by 1, the ratio is increased by 0.1%.) (Set range: 1 – 99, Default: 50)
Each mode can be selected by pressing the density select key.
<table>
<tr><th>Mode</th><th>Display lamp</th><th>Lamp ON</th><th>Default</th></tr>
<tr><td>Sub scanning direction magnification ratio adjustment on the SPF document front surface.</td><td>COPY mode lamp</td><td>AE mode lamp</td><td>50</td></tr>
</table>
∗ When there is no document in the SPF, copy is inhibited.</td></tr>
<tr><td>49</td><td>01</td><td>Flash ROM program writing mode
(Operating procedure)
When this simulation is executed, “d” is displayed on the display and the machine enters the Flash ROM program writing mode.
Use the writing tool to write the program from PC. During writing, the display indicates as shown below. After completion of downloading, turn OFF/ON the power to reset.
<table>
<tr><th>Status</th><th>Display</th><th>Pre-heat lamp</th><th>Ready lamp</th></tr>
<tr><td>Download data reception</td><td>“d” ON</td><td>ON</td><td>OFF</td></tr>
<tr><td>Data erase start</td><td>“d” ON</td><td>OFF</td><td>ON</td></tr>
<tr><td>Data writing (Boot section)</td><td>“d” ON</td><td>Blink</td><td>OFF</td></tr>
<tr><td>Data writing (program section)</td><td>“d” ON</td><td>Blink</td><td>Blink</td></tr>
<tr><td>Sum check</td><td>“d” ON</td><td>ON</td><td>ON</td></tr>
<tr><td>Download complete</td><td>“0FF” ON</td><td>OFF</td><td>OFF</td></tr>
<tr><td>Error state</td><td>“E *” ON</td><td>OFF</td><td>OFF</td></tr>
</table>
∗ “*” in an error display indicates the error position.
<table>
<tr><td>1</td><td>Data reception error</td></tr>
<tr><td>2</td><td>Loader function transfer</td></tr>
<tr><td>3</td><td>FLASH ROM delete</td></tr>
<tr><td>4</td><td>FLASH ROM writing (Boot section)</td></tr>
<tr><td>5</td><td>FLASH ROM writing (Program section)</td></tr>
<tr><td>6</td><td>Sum check (Loader section)</td></tr>
<tr><td>7</td><td>Sum check (Boot section)</td></tr>
<tr><td>8</td><td>Sum check (Program section)</td></tr>
</table></td></tr>
</table>

Main code	Sub code	Content
50	01	Lead edge image position

Used to adjust the copy image position and the lead edge void quantity on the copy paper. The adjustment is made by adjusting the image scan start position and the print start position (resist roller ON timing) at 100%.

(Operating procedure)

When this simulation is executed, the current setup value is displayed the current setup value is displayed in two digits. (Center value: 50) Press the copy mode select key to select your desired copy mode, and the display will change. Enter the adjustment value with the 10-key and press the PRINT switch, and the setup value will be saved and a copy will be made. Press the clear key to save the setup value and exit from the simulation mode. When the adjustment is made for the main cassette feed, all the adjustment values at all the paper feed ports become the same. (Increasing the setup value by 1 corresponds to about 0.1mm shift.)

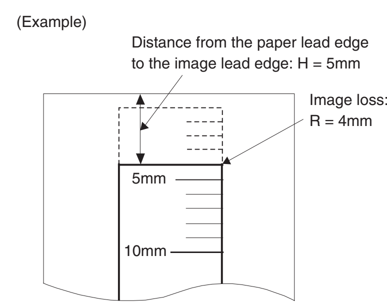
Adjustment mode	Lamp ON
Print start position (Main cassette paper feed)	AE, main cassette lamp
☆ Print start position (2nd cassette paper feed)	AE, 2nd cassette lamp
Print start position (Manual paper feed)	AE, manual feed lamp
Image lead edge void quantity	TEXT, main cassette lamp
Image scan start position	PHOTO, main cassette lamp
Image rear edge void quantity	AE, TEXT, PHOTO, main cassette lamp

☆ : Supported if the model is installed and skipped if it is not installed.

(Adjustment procedure)

AE ON	TEXT ON	PHOTO ON
↓	↓	↓

1. Set the print start position (A), the lead edge void quantity (B) and the scan start position (C) to 1 (Set range: 1 – 99), and make a copy at 100%.
2. Measure the image loss quantity (R mm) of the scale.
   Set C = 10 × R (mm) (Example: Set 40.)
   When the value C is increased by 10, the image loss is decreased by 1mm. (Default: 50)
3. Measure the distance (H mm) from the paper lead edge to the image print start position.
   Set A = 10 × H (mm) (Example: set 50)
   When the value A is increased by 1mm, the image lead edge is shifted to the paper lead edge by 1mm. (Default: 50)
4. Set the lead edge void quantity to B = 50 (2.5mm). (Default: 50)
   When the value B is increased by 10, the void is increased by about 1mm. (When set to 25 or less, the void becomes zero.)



- The SPF adjustment is performed by adjusting the SPF image scan start position.

Main code	Sub code	Content
50	06	Copy lead edge position adjustment (SPF)

The SPF copy lead edge adjustment is performed.

When the document scan position adjustment value is increased by 1, the scan start timing is advanced by 0.1mm.

As the print result, it is shifted in the direction opposite to the scan start position.

Each mode can be selected by pressing the density select key.

Mode	Lamp ON	Default
Front surface document scan position adjustment	AE mode lamp	50
Rear edge void adjustment (SPF)	PHOTO mode lamp	

∗ When there is no document in the SPF, copy is inhibited.

Main code	Sub code	Content
50	10	Center offset adjustment

Used to adjust the copy image position on the copy paper and the center offset position when scanning a document.

(Operating procedure)

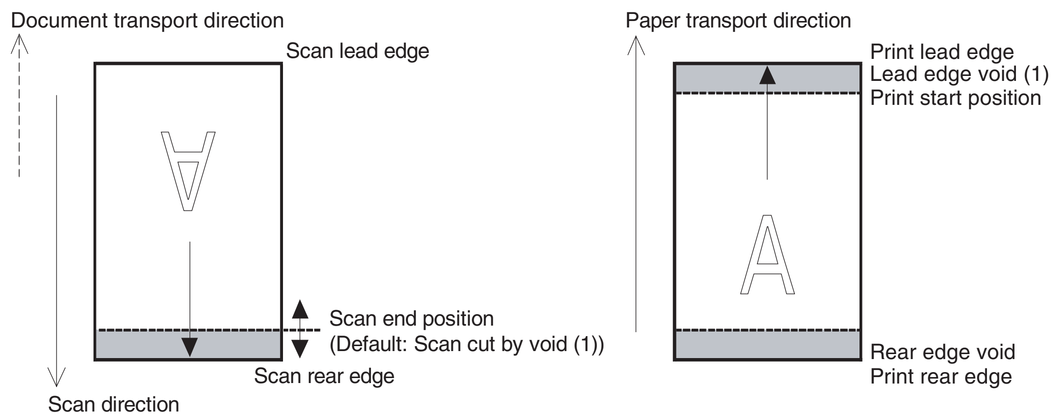
When this simulation is executed, the current setup value is displayed. Enter the adjustment value with the 10-key and press the PRINT switch, and the entered value will be saved and a copy will be made. When the clear key is pressed, the entered value will be saved and the simulation will be terminated. (When the setup value is increased by 1, shift is increased by 0.1mm.)

Adjustment mode	Lamp ON
Print center offset (Main cassette paper feed)	AE, main cassette lamp
☆ Print center offset (2nd cassette paper feed)	AE, 2nd cassette lamp
Print center offset (Manual paper feed)	AE, manual paper feed lamp
Second side center offset (Main cassette paper feed)	TEXT, main cassette lamp

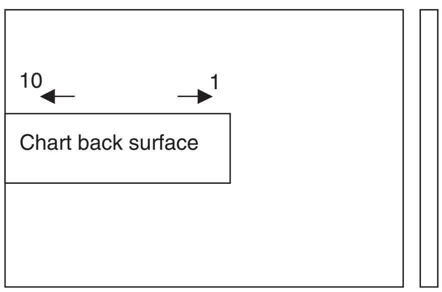
☆ : Supported only for installing models, and skipped for not-installing models.

∗ When the setup value is too great, outside of the shading area may be read, and black streaks may be produced on the edges.
  When the adjustment value is increased, the image is shifted to the left.
  When the adjustment value is decreased, the image is shifted to the right.

<table>
<tr><th>Main code</th><th>Sub code</th><th>Content</th></tr>
<tr><td>50</td><td>12</td><td>Document off-center adjustment
The document scan off-center adjustment is performed.
The adjustment mode is changed over with the copy mode select key. (Adjustment range: 1 – 99, Default: 50)
When the adjustment value is increased, the print result is shifted to the left.
<table>
<tr><th>Mode</th><th>Lamp ON</th><th>Default</th></tr>
<tr><td>Platen document scanning</td><td>AE mode lamp</td><td rowspan="2">50</td></tr>
<tr><td>SPF document front surface scanning</td><td>TEXT mode lamp</td></tr>
</table>
</td></tr>
<tr><td></td><td>18</td><td>Memory reverse position adjustment in duplex copy
When this simulation is executed, the current setup value of correction is displayed. Enter the correction value with the 10-key and press the PRINT switch, and the entered value will be saved.
Front surface printing in the S-D mode and printing on even pages in the D-S mode are reverse memory copy operations from the document rear edge section.
When, therefore, the output image print position adjustment is required, adjust as follows:
In the reverse memory copy operation, if the document scan direction is in the direction of the arrow in the figure, the scan rear edge section of the image is printed first.
When, therefore, the print lead edge is shifted, set the reference chart so that the reference position is in the rear edge section, and use this simulation to adjust so that the print image lead edge comes to the lead edge.
Since printing is performed by processing the scanned image from the scan end position to the scan lead edge, the print lead edge position adjustment is performed by changing the end data position stored in memory with the simulation setup value.



</td></tr>
<tr><td></td><td>19</td><td>Duplex copy rear edge void adjustment
Used to adjust the rear edge void quantity in duplex copy.
(Operating procedure)
When this simulation is executed, the current setup value is displayed the current setup value is displayed in two digits. (Center value: 50 However, setup 50 = setup 0) When the correction value is set to 0, the correction value is written as 50.
Press the copy mode select key to select your desired copy mode, and the display will change. Enter the adjustment value with the 10-key and press the PRINT switch, and the setup value will be saved and a copy will be made. (The paper information is cleared for every copying.) Press the clear key to save the setup value and exit from the simulation mode.
(Increasing the setup value by 1 increases the void quantity by about 0.1mm.)
<table>
<tr><th>Adjustment mode</th><th>Lamp ON</th></tr>
<tr><td>Paper rear edge void quantity</td><td>TEXT lamp</td></tr>
<tr><td>Print start position (Duplex back)</td><td>PHOTO lamp</td></tr>
</table>
</td></tr>
<tr><td>51</td><td>02</td><td>Resist quantity adjustment
Used to adjust the contact pressure of paper against the machine resist roller and the RSPF resist roller.
(Operating procedure)
When this simulation is executed, the current setup value is displayed.
Enter the adjustment value with the 10-key and press the PRINT switch, the entered set value will be saved and a copy will be made. When the clear key is pressed, the entered value will be saved and the machine will exit from the simulation mode.
<table>
<tr><th>Adjustment mode</th><th>Lamp ON</th></tr>
<tr><td>Main cassette paper feed</td><td>AE, main cassette lamp</td></tr>
<tr><td>☆ 2nd cassette paper feed</td><td>AE, 2nd cassette lamp</td></tr>
<tr><td>Manual paper feed</td><td>AE, manual paper feed lamp</td></tr>
<tr><td>☆ duplex back</td><td>TEXT, PHOTO, main cassette lamp</td></tr>
</table>
☆ : Supported only for installing models, and skipped for not-installing models.
</td></tr>
</table>

<table>
<tr><th>Main code</th><th>Sub code</th><th>Content</th></tr>
<tr><td>53</td><td>08</td><td>SPF scan position automatic adjustment
Place three sheets of white paper so that they cover the SPF scan glass and the OC glass, and execute the simulation with the OC cover open, the mirror unit scans from the home position to the SPF scan position to identify the SPF glass cover edge position by the difference in the CCD output levels of the SPF glass cover edge and the OC side document glass.
Default is 50. Adjustment range is 0 – 99. Adjustment increment: 1 = about 0.127mm
In the case of AUTO, when START key is pressed, the mirror unit scans from the home position to the SPF scan position with the current adjustment value displayed. Then the SPF glass cover edge position is determined from the difference in the CCD output levels of the SPF glass cover edge and the OC side document glass.
If the adjustment is completed normally, the adjusted value is displayed on the 7seg/LCD. If it is terminated abnormally, the following lamp is turned ON.
"JAM lamp": When the operation is canceled by pressing C key during execution, the mirror is returned and "- -" is displayed.
The density select key is used to select the mode.
<table>
<tr><th>Mode</th><th>Lamp ON</th><th>Default</th></tr>
<tr><td>SPF scan position auto adjustment</td><td>AE mode lamp</td><td rowspan="2">50</td></tr>
<tr><td>SPF scan position manual adjustment</td><td>TEXT mode lamp</td></tr>
</table>
</td></tr>
<tr><td>61</td><td>03</td><td>Polygon motor check (HSYNC output check)
(Operation/Procedure)
When the START key is pressed, HSYNC is performed and the polygon motor is rotated for 30 sec.
At that time, the Zoom lamp is lit for 100msec for every 3 times that the HSYNC is detected.</td></tr>
<tr><td rowspan="4">63</td><td>01</td><td>Shading check
Used to display the detection level of the white board for shading.
(Operating procedure)
When the PRINT switch is pressed, the mirror base unit moves to the white board for shading to light the copy lamp. Under this state, the level of one pixel at the CCD center which is not corrected for 10sec in 1 sec, and the result is displayed on the value display section.</td></tr>
<tr><td>02</td><td>Black level automatic correction
The black level target value for using in the black level adjustment of the white balance is obtained.
When this simulation is executed, the current correction value is displayed in 12bit hexadecimal number in 3 digits.
Place the gray gradation chart (UKOG-0162FCZZ) used as the correction document face-down at the center of the left edge of the platen so that the density 10 side (black side) is on the left side of the OC.


When START key is pressed, the mirror base unit scans the chart to calculate the correction value.
After completion of correction, the revised correction value is displayed on the LCD/7seg.
Default: 0</td></tr>
<tr><td>12</td><td>Light quantity stabilization wait time setting
In the light quantity stabilization process on white balance, the wait time before entering the light quantity level stabilization process is set. (Note: The light quantity level of the previous light quantity stabilization is used as the target. When the light quantity level reaches the level during the wait time, the wait time set with this simulation is ignored and the stabilization process is started.
When this simulation is executed, the currently set value is displayed.
Enter the adjustment value with UP/UP key, and press START key to save the entered value.
Set range: 0 – 99 (Corresponding to the light quantity stabilization wait time 0 – 99 sec)
Default: 15 (15 sec)</td></tr>
<tr><td>13</td><td>Light quantity stabilization band setting
When the difference between the minimum value and the maximum value of the light quantity levels sampled for 3.2 sec in 100msec cycle in the light quantity stabilization process on white balance is smaller than the set value of this simulation, it is judged that the light quantity is stabilized. (Note: The magnification ratio of the AFE gain setting is automatically reflected on the stabilization band.)
When this simulation is executed, the currently set value is displayed.
Enter the adjustment value with UP/UP key, and press START key to save the entered value.
Set range: 1 – 99 (Light quantity stabilization band: Corresponds to 1 – 99 of 4,095 gradations)
Default: 16</td></tr>
</table>

Main code	Sub code	Content
64	01	Self print Print of one page is made regardless of the status of the optical system. (Operating procedure) When this simulation is executed, warm-up is performed and the ready lamp is lighted. Enter the code number with the 10-key, and select the cassette with the cassette select key and press the PRINT switch, and paper feed operation will be made from the selected cassette and printing of the selected pattern will be made. Printing is in 1by2 mode, or grid pattern.

Code number	Pattern
0	1by2
1	Grid pattern
2	White paper
3	Black background

Main code	Sub code	Content
67	50	USB receive speed adjustment (USB1.1) Used to set the limitation on the print data receive speed of USB2.0 (Full speed) port (USB port on the machine). → When print images from USB2.0 (Full speed) port are disturbed, change the setting and try again. When this simulation is executed, the currently set code number is displayed. Enter the code number corresponding to the adjustment value, and press START key to change the setting.

Code number	Setting	Speed
1	FAST	↑ Fast
2	NORMAL1	
3	NORMAL2	
4	SLOW	↓ Slow

4. Trouble codes

A. Trouble codes list

Main code	Sub code	Details of trouble
E7	01	Duplex model memory setup error, memory not-detected error
	02	LSU trouble
	10	Shading trouble (Black correction)
	11	Shading trouble (White correction)
	16	Abnormal laser output
F5	02	Copy lamp lighting abnormality
H2	00	Thermistor open
H3	00	Heat roller high temperature detection
H4	00	Heat roller low temperature detection
L1	00	Feeding is not completed within the specified time after starting feeding. (The scan head locking switch is locked)
L3	00	Scanner return trouble
L4	01	Main motor lock detection
	32	Exhaust fan motor lock detection trouble
L6	10	Polygon motor lock detection
U2	04	EEPROM read/write error (Serial communication error)
	11	Counter check sum error (EEPROM)

B. Details of trouble codes

Main code	Sub code		Details of trouble
E7	01	Content	Duplex model memory setup error, memory not-detected error
		Detail	The memory is not set properly or the memory capacity is not set to the duplex setup (6M).
		Check and remedy	Set SIM 26-39 code number to 2.
	02	Content	LSU trouble
		Detail	The BD signal from the LSU cannot be detected in a certain cycle. (Always OFF or always ON)
		Cause	LSU connector or LSU harness defect or disconnection Polygon motor rotation abnormality Laser beams are not generated. MCU PWB abnormality.
		Check and remedy	Check connection of the LSU connector. Execute SIM 61-03 to check the LSU operations. Check that the polygon motor rotates normally. Check that the laser emitting diode generates laser beams. Replace the LSU unit. Replace the MCU PWB.
	10	Content	Shading trouble (Black correction)
		Detail	The CCD black scan level is abnormal when the shading.
		Cause	Improper connection of the CCD unit flat cable CCD unit abnormality MCU PWB abnormality
		Check and remedy	Check connection of the CCD unit flat cable. Check the CCD unit.

Main code	Sub code		Details of trouble
E7	11	Content	Shading trouble (White correction)
		Detail	The CCD white scan level is abnormal when the shading.
		Cause	Improper connection of the CCD unit flat cable Dirt on the mirror, the lens, and the reference white plate Copy lamp lighting abnormality CCD unit abnormality MCU PWB abnormality (When occurred in the SPF scan position.) Improper installation of the mirror unit
		Check and remedy	Clean the mirror, lens, and the reference white plate. Check the light quantity and lighting status of the copy lamp (SIM 05-03). Check the MCU PWB.
	16	Content	Abnormal laser output
		Detail	When the laser output is stopped, HSYNC is detected.
		Cause	Laser abnormality MCU PWB abnormality.
		Check and remedy	Check the laser emitting diode operation. Replace the MCU PWB.
F5	02	Content	Copy lamp lighting abnormality
		Detail	The copy lamp does not turn on.
		Cause	Copy lamp abnormality Copy lamp harness abnormality CCD PWB harness abnormality.
		Check and remedy	Use SIM 5-3 to check the copy lamp operations. **When the copy lamp lights up.** Check the harness and the connector between the CCD unit and the MCU PWB. **When the copy lamp does not light up.** Check the harness and the connector between the copy lamp unit and the MCU PWB. Replace the copy lamp unit. Replace the MCU PWB.
H2	00	Content	Thermistor open
		Detail	The thermistor is open. The fusing unit is not installed.
		Cause	Thermistor abnormality Control PWB abnormality Fusing section connector disconnection The fusing unit is not installed.
		Check and remedy	Check the harness and the connector between the thermistor and the PWB. Use SIM 14 to clear the self diagnostic display.

Main code	Sub code		Details of trouble
H3	00	Content	Heat roller high temperature detection
		Detail	The fusing temperature exceeds 240°C.
		Cause	Thermistor abnormality Control PWB abnormality Fusing section connector disconnection.
		Check and remedy	Use SIM 5-02 to check the heater lamp blinking operation. **When the lamp blinks normally.** Check the thermistor and its harness. Check the thermistor input circuit on the control PWB. **When the lamp keeps ON.** Check the power PWB and the lamp control circuit on the MCU PWB. Use SIM 14 to clear the self diagnostic display.
H4	00	Content	Heat roller low temperature detection
		Detail	1) When the target temperature (165°C) is not reached in 55 sec after starting warming-up. 2) When the temperature below 100°C is detected for 300ms under the ready print state. * "Starting warming-up" means not only that in power supply but also reset that in reset from shut-off and in side door close. (The timing of generating H4 is not limited to that in power supply.)
		Cause	Thermistor abnormality Heater lamp abnormality Thermostat abnormality Control PWB abnormality
		Check and remedy	Use SIM 5-02 to check the heater lamp blinking operation. **When the lamp blinks normally.** Check the thermistor and its harness. Check the thermistor input circuit on the control PWB. **When the lamp does not light up.** Check for disconnection of the heater lamp and the thermostat. Check the interlock switch. Check the power PWB and the lamp control circuit on the MCU PWB. Use SIM 14 to clear the self diagnostic display.

Main code	Sub code	Details of trouble	
L1	00	Content	Feeding is not completed within the specified time after starting feeding. (The scan head locking switch is locked)
		Detail	The white area and the black marking on the shading plate are used to obtain the difference in the CCD level values for judgment of lock. When the difference in the levels of which and black is small, it is judged that the black mark could not be scanned by lock and the trouble code "L1" is displayed.
		Cause	The scan head is locked by the lock switch. Mirror unit abnormality The scanner wire is disconnected. The origin detection sensor abnormality Mirror motor harness abnormality
		Check and remedy	Check to confirm that the scan head lock switch is released. Use SIM 1-1 to check the mirror reciprocating operations. **When the mirror does not feed.** Check for disconnection of the scanner wire. Check the harness and the connector between the mirror motor and the MCU PWB. Replace the mirror unit. Replace the MCU PWB. **When the mirror does feed.** Use SIM 1-2 to check the mirror home position sensor.
L3	00	Content	Scanner return trouble
		Detail	When the mirror base is returned for the specified time (6 sec) in mirror initializing after turning on the power, the mirror home position sensor (MHPS) does not turn ON. Or when the mirror base is returned for the specified time (about 6 sec) after start of copy return, the mirror home position sensor (MHPS) does not turn ON.
		Cause	Mirror unit abnormality Scanner wire disconnection Origin detection sensor abnormality Mirror motor harness abnormality
		Check and remedy	Use SIM 1-1 to check the mirror reciprocating operations. **When the mirror does not return.** Check for disconnection of the scanner wire. Check the harness and the connector between the mirror motor and the MCU PWB. Replace the mirror unit. Replace the MCU PWB. **When the mirror does feed.** Use SIM 1-2 to check the mirror home position sensor.

Main code	Sub code	Details of trouble	
L4	01	Content	Main motor lock detection
		Detail	When the main motor encoder pulse is not detected for 100 msec.
		Cause	Main motor unit abnormality Improper connection or disconnection the main motor and the harness. MCU PWB abnormality
		Check and remedy	Use SIM 25-01 to check the main motor operations. Check connection of the main motor harness/connector. Replace the main motor. Replace the MCU PWB.
	32	Content	Exhaust fan motor lock detection trouble
		Detail	The error detection is started after 2 sec from starting rotation of the exhaust fan motor. 1) The continuous rotation state of 250ms is not detected for 1 sec after starting detection. 2) When the lock sensor (in the exhaust fan) detects the HIGH level (unstable) after detection the lock state (stable state).
		Cause	Exhaust fan motor connector connection trouble Exhaust fan motor trouble MCU PWB trouble
		Check and remedy	Exhaust fan motor connector connection check Exhaust fan motor replacement Replace the MCU PWB.
L6	10	Content	Polygon motor lock detection
		Detail	The lock signal (specified rpm signal) does not return within a certain time (about 20 sec) from starting the polygon motor rotation.
		Cause	Polygon motor unit abnormality Improper connection or disconnection of the polygon motor and the harness. MCU PWB abnormality
		Check and remedy	Use SIM 61-1 to check the polygon motor operations. Check connection of the polygon motor harness/connector. Replace the polygon motor. Replace the MCU PWB.
U2	04	Content	EEPROM read/write error (Serial communication error)
		Detail	EEPROM access process error
		Cause	EEPROM abnormality
		Check and remedy	Check that the EEPROM is properly set. Use SIM 16 to cancel the trouble. Replace the MCU PWB.
	11	Content	Counter check sum error (EEPROM)
		Detail	Check sum error of the counter area in the EEPROM
		Cause	EEPROM abnormality
		Check and remedy	Check that the EEPROM is properly set. Use SIM 16 to cancel the trouble. Replace the MCU PWB.

[11] USER PROGRAM

The conditions of factory setting can be changed according to the use conditions.

1. Functions that can be set with user programs

Toner save mode

Reduces toner consumption by approximately 10%.

Power save modes

The unit has two power save modes of operation: preheat mode and auto power shut-off mode.

Preheat mode

When the unit enters the preheat mode, the power save ( ) indicator will light up and other indicators will remain on or off as before. In this condition, the fuser in the unit is maintained at a lower heat level, thereby saving power. To copy from the preheat mode, make desired copier selections and press the start ( ) key using the normal copying procedure.

Auto power shut-off mode

When the unit enters the auto power shut-off mode, the power save ( ) indicator will light up and other indicators except the ONLINE indicator will go out. The auto power shut-off mode saves more power than the preheat mode but requires a longer time before starting copying. To copy from the auto power shut-off mode, press the start ( ) key. Then make desired copier selections and press the start ( ) key using the normal copying procedure.

Auto clear

The unit returns to the initial settings a preset amount of time after the end of job.

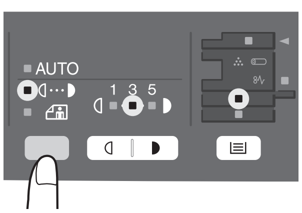
This preset amount of time (auto clear time) can be changed.

Resolution of AUTO & MANUAL mode

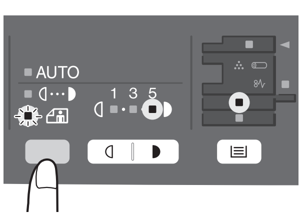
You can set the copy resolution used for AUTO and MANUAL ( ) exposure mode.

2. Toner save mode

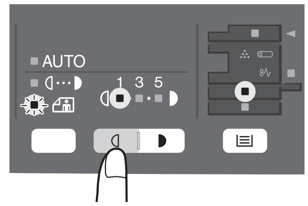
1) Press the exposure mode selector key to select the MANUAL ( ) mode.



2) Press and hold down the exposure mode selector key for approximately 5 seconds. The MANUAL ( ) indicator will go out and the PHOTO ( ) indicator will begin to blink. The light and dark indicator marked "5" will light up, indicating the standard toner mode is active.



3) To enter the toner save mode, press the light ( ) key. The light and dark indicator marked "1" will light up, indicating the toner save mode is selected.



4) Press the exposure mode selector key. The PHOTO ( ) indicator will stop blinking and light up steadily. The light and dark indicator marked "3" will light up. The toner save mode is now active.

Note: To return to the standard mode, repeat the procedure but use the dark ( ) key to select exposure level "5" in step 3).

3. User programs

The user programs allow the parameters of certain functions to be set, changed, or canceled as desired.

Set the power save modes, auto clear time, preheat mode, SPF automatic original discharge time, resolution of AUTO & MANUAL mode and reset factory setting.

1) Press and hold down the light ( ) key simultaneously for more than 5 seconds until all the alarm indicators (, ,) blink and " - - " appears in the display.
2) Use the left copy quantity ( ) key to select a user program number (1: Auto clear time, 2: Preheat mode, 3: Auto power shut off mode, 4: Auto power shut off timer, 6: SPF automatic original discharge time, 10: Resolution of AUTO & MANUAL mode, 21: Reset factory, 24: Prevention of OC copies when the SPF is up function, 25: Copy effective paper width setting function (Bypass tray), 26: Copy effective paper width setting function (Tray 1), 27: Copy effective paper width setting function (Tray 2) (AL-2040CS only), 28: Selection of copy start state (Polygon rotation on/off), 29: Fusing temperature setting when the bypass tray is used). The selected number will blink in the left side of the display.
3) Press the start ( ) key. The entered program number will be steadily lit and the currently selected parameter number for the program will blink on the right side of the display.
4) Select the desired parameter using the right copy quantity ( ) key. The entered parameter number will blink on the right of the display.

Program No.	Mode	Parameters
1	Auto clear time	1 → 10 sec., 2 → 30 sec., *3 → 60 sec., 4 → 90 sec., 5 → 120 sec., 6 → OFF
2	Preheat mode	*1 → 30 sec., 2 → 60 sec., 3 → 5 min., 4 → 30 min., 5 → 60 min., 6 → 120 min., 7 → 240 min.
3	Auto power shut off mode	*1 → ON, 2 → OFF
4	Auto power shut off timer	*1 → 5 min., 2 → 30min., 3 → 60 min., 4 → 120 min., 5 → 240 min.
6	SPF automatic original discharge time	1 → 5 min., *2 → 30 min., 3 → 60 min., 4 → 120 min., 5 → 240 min., 6 → OFF
10	Resolution of AUTO & MANUAL mode	*1 → 300dpi, 2 → 600dpi
21	Reset factory	1 → YES, *2 → NO

Program No.	Mode	Parameters
24	Prevention of OC copies when the SPF is up function	*1 → ON, 2 → OFF
25	Copy effective paper width setting function (Bypass tray)	*1 → Large (LETTER/A4 width), 2 → Small (INVOICE/B5R width)
26	Copy effective paper width setting function (Tray 1)	*1 → Large (LETTER/A4 width), 2 → Small (INVOICE/B5R width)
27	Copy effective paper width setting function (Tray 2) (AL-2040CS only)	*1 → Large (LETTER/A4 width), 2 → Small (INVOICE/B5R width)
28	Selection of copy start state (Polygon rotation on/off)	*1 → ON, 2 → OFF
29	Fusing temperature setting when the bypass tray is used	*1 → Low, 2 → High

∗ Factory default settings are indicated with an asterisk (*).

5) Press the start ( ) key. The right-hand number in the display will be steadily lit and the entered value will be stored.

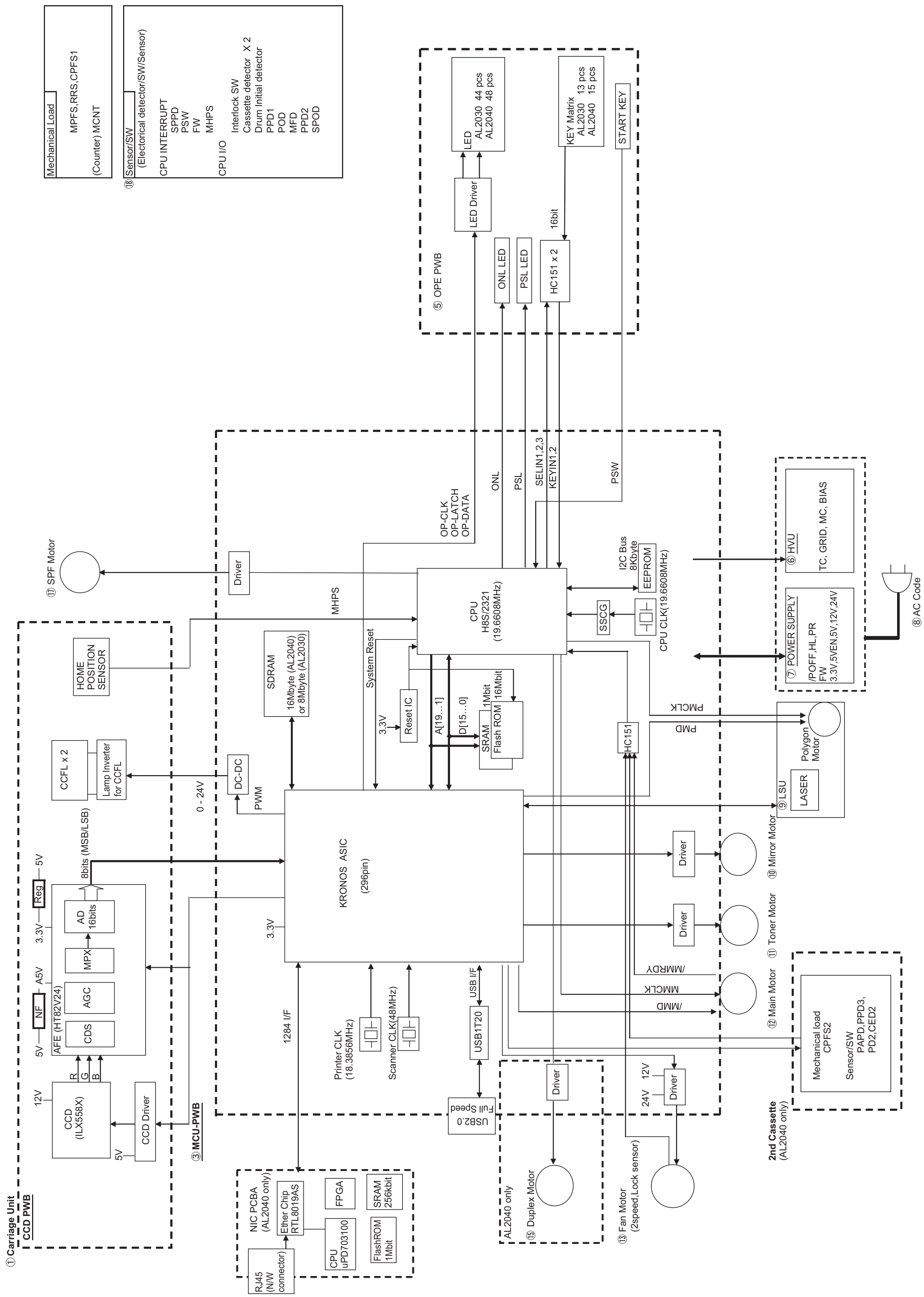
Note: To change the setting or to set another mode, press the clear key. The unit will return to step 2).

6) Press the light ( ) key to return to the normal copy mode.

[12] ELECTRICAL SECTION

1. Block diagram

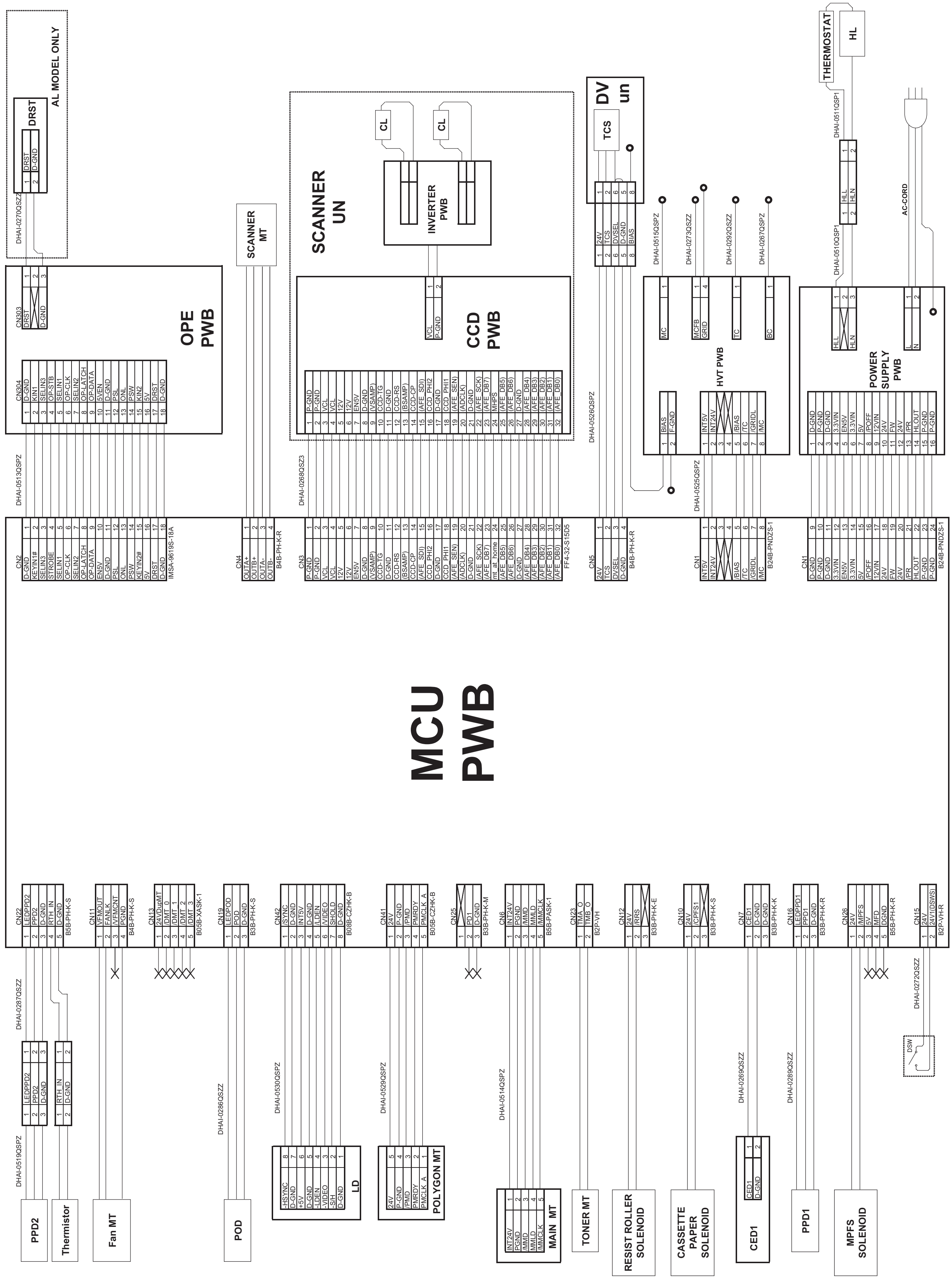
A. Overall block diagram



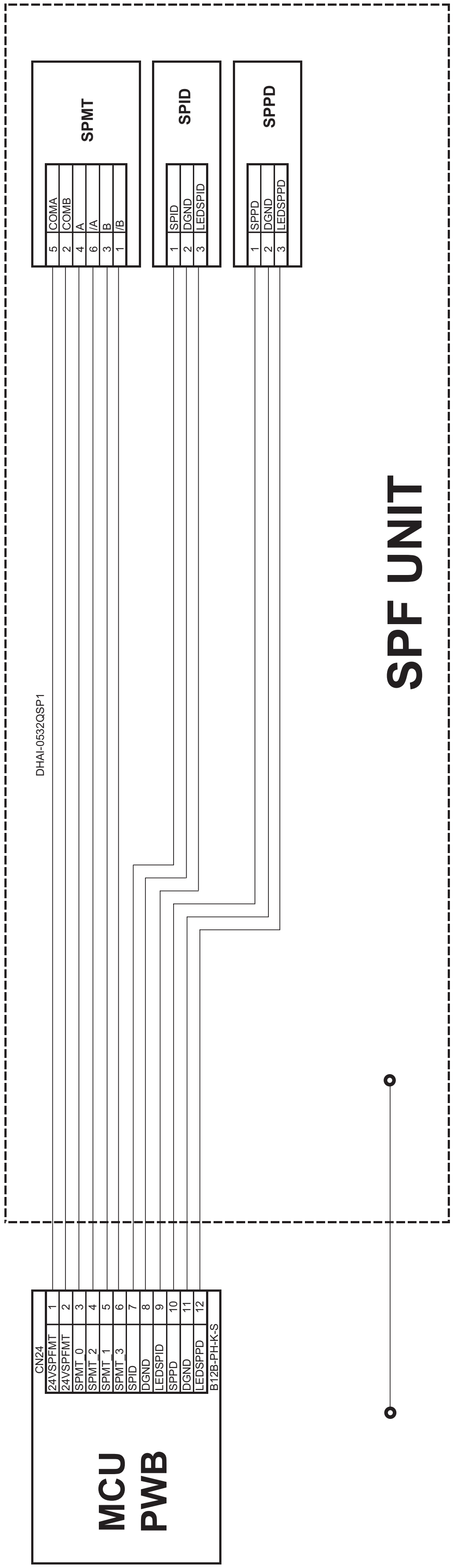
2. Actual wiring diagram

A. AL-2030

(1) MCU PWB (1/2)

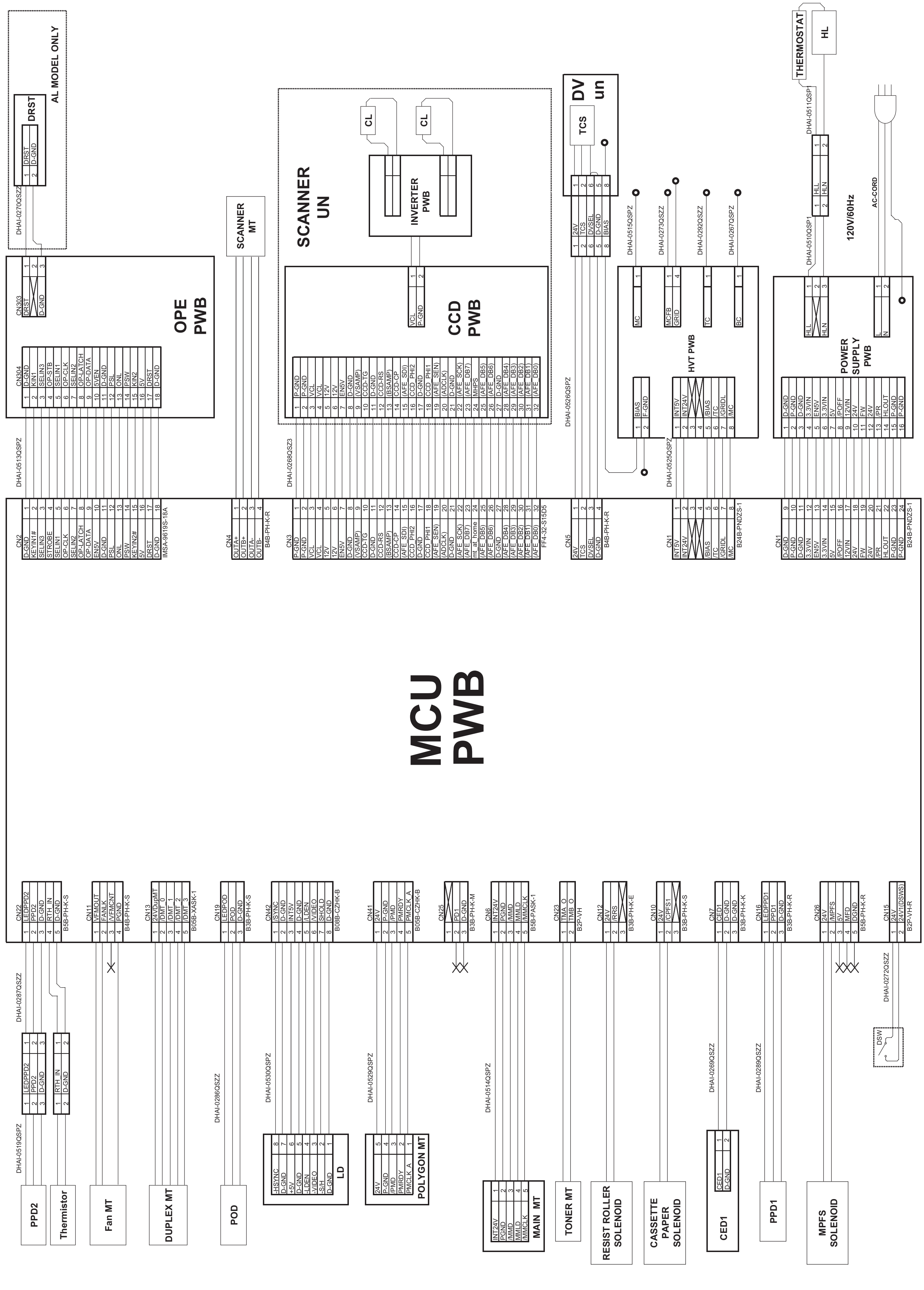


(2) SPF unit (2/2)

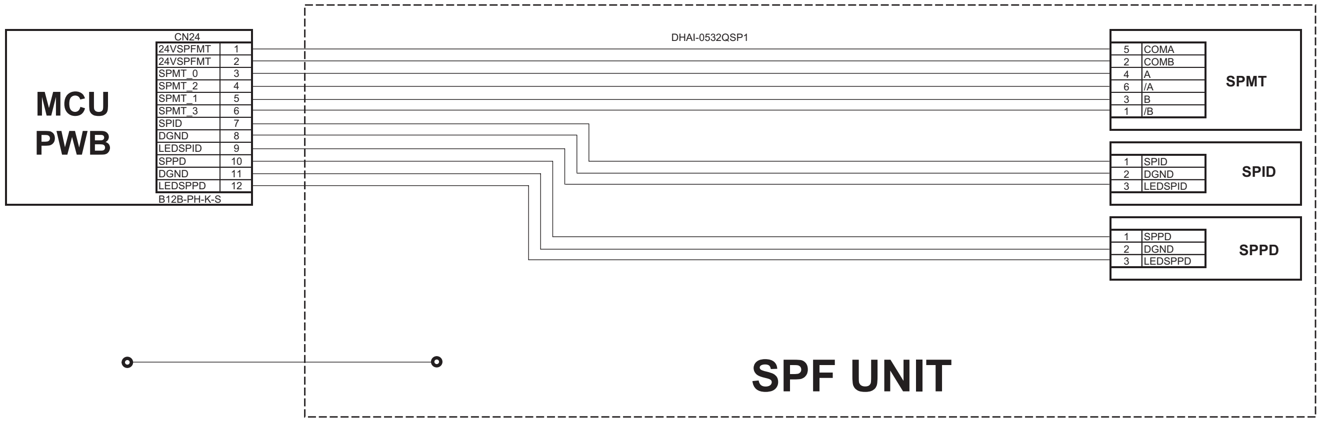

SPF UNIT
SPMT
5 COMA
2 COMB
4 A
6 /A
3 B
1 /B
SPID
1 SPID
2 DGND
3 LEDSPID
SPPD
1 SPPD
2 DGND
3 LEDSPPD
DHAI-0532QSP1
MCU PWB
CN24
24VSPFMT 1
24VSPFMT 2
SPMT_0 3
SPMT_2 4
SPMT_1 5
SPMT_3 6
SPID 7
DGND 8
LEDSPID 9
SPPD 10
DGND 11
LEDSPPD 12
B12B-PH-K-S

B. AL-2040CS

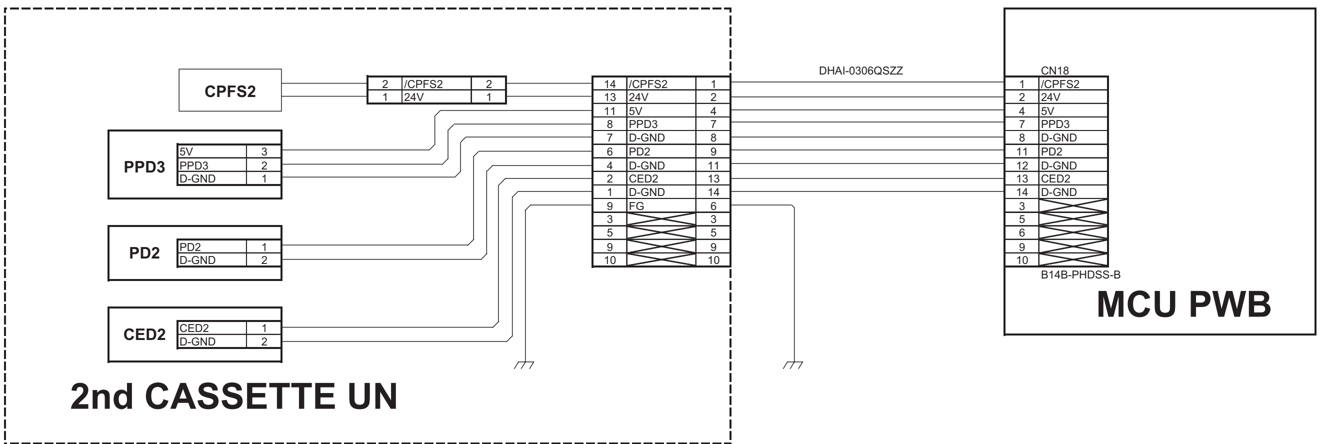
(1) MCU PWB (1/4)



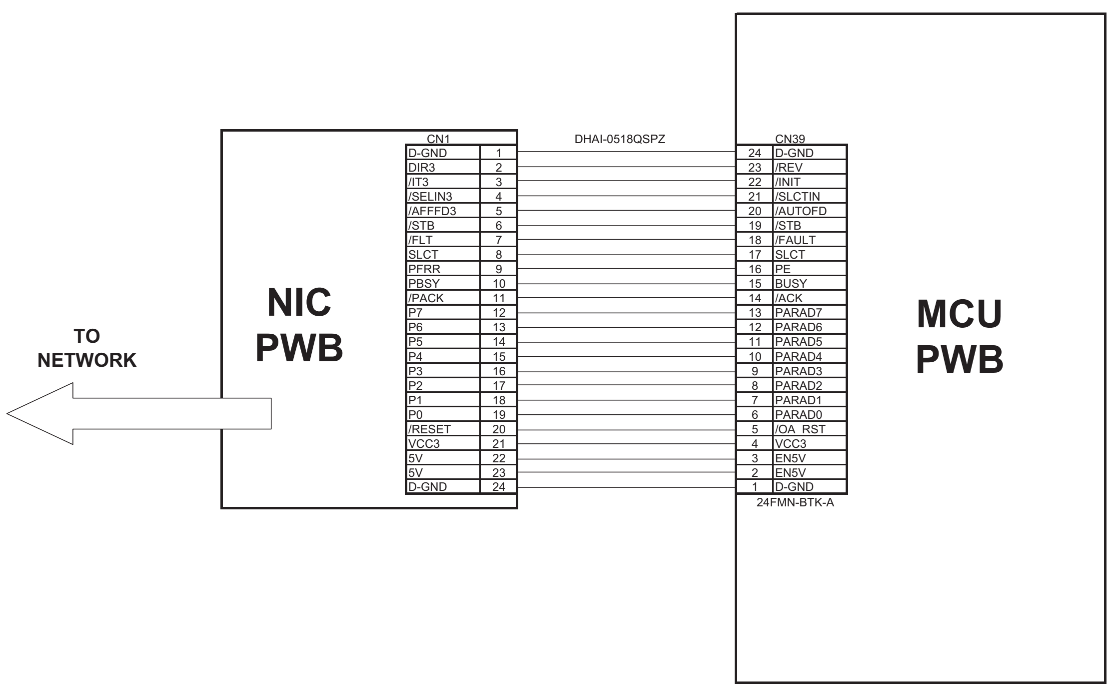
(2) SPF unit (2/4)



(3) 2nd cassette unit (3/4)



(4) NIC PWB (4/4)

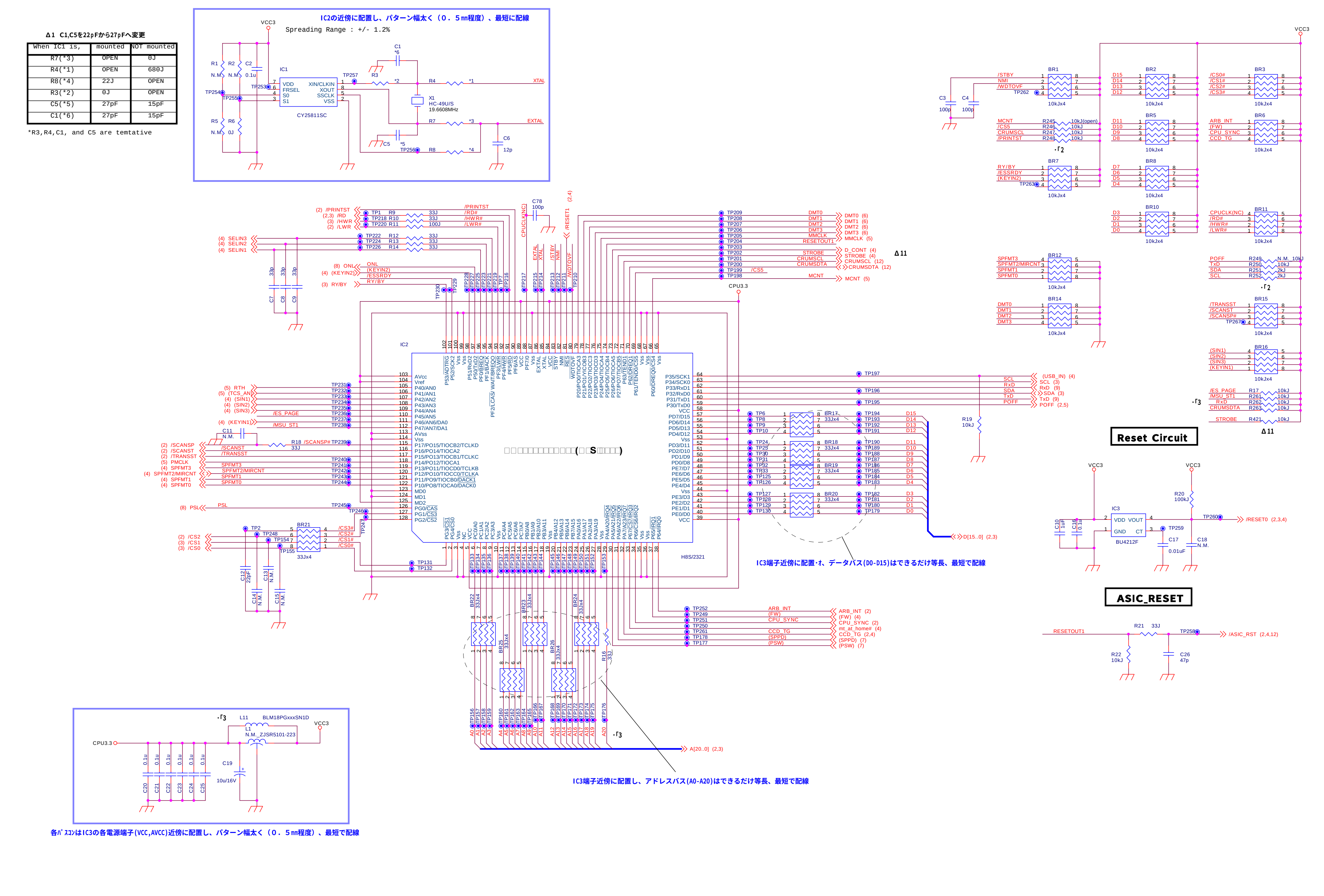


3. Signal name list

Signal name	Name	Function/Operation	Section
LEDPPD2	PPD2 sensor power		Fusing section
PPD2	PPD2 sensor	Paper transport detection	Fusing section
RTH_IN	Thermistor	Fusing section thermistor temperature detection	Fusing section
VFMOUT	Fusing fan	Fan drive signal	Optical section
FANLK	Fusing fan	Fan lock detection signal	Optical section
/VFMCNT	Fan speed signal	Fan rotation speed control	Optical section
/DMT_0	DUP motor	DUP motor phase control	Duplex drive section
/DMT_1	DUP motor	DUP motor phase control	Duplex drive section
/DMT_2	DUP motor	DUP motor phase control	Duplex drive section
/DMT_3	DUP motor	DUP motor phase control	Duplex drive section
LEDPOD	POD sensor power		Paper exit section
POD	POD sensor	Paper transport detection	Paper exit section
/SYNC	Laser	Horizontal sync signal from the LSU	LSU
/LDEN	Laser	Laser circuit control signal	LSU
/VIDEO	Laser	Laser drive signal	LSU
SHOLD	Laser	Laser APC signal	LSU
/PMD	Polygon motor	Polygon motor drive signal	LSU
PMRDY	Polygon motor	Polygon motor ON/OFF detection signal	LSU
PMCLK_A	Polygon motor	Clock signal to the polygon motor	LSU
PD1	PD SW sensor	1st CS paper width sensor	Not used
/MMD	Main motor	Polygon motor drive signal	Main drive section
MMLD	Main motor	Polygon motor ON/OFF detection signal	Main drive section
/MMCLK	Main motor	Clock signal to the polygon motor	Main drive section
TMA_O	Toner motor	Toner motor phase control	Toner motor drive section
TMB_O	Toner motor	Toner motor phase control	Toner motor drive section
/RRS	1st transport solenoid		Paper transport section
/CPFS1	1st CS pickup solenoid		Paper transport section
CED1	Machine cassette detection		Paper transport section
LEDPPD1	PPD sensor power		Paper transport section
PPD1	PPD sensor	Paper transport detection	Paper transport section
/MPFS	Multi bypass solenoid		Optical section
KEYIN1#	Key scan input	Key detection control	Operation section
SELIN3	Select signal 3	HC151 select signal	Operation section
STROBE	LED driver control		Operation section
SELIN1	Select signal 1	HC151 select signal	Operation section
OP-CLK	LED driver control		Operation section
SELIN2	Select signal 2	HC151 select signal	Operation section
OP-LATCH	LED driver control		Operation section
OP-DATA	LED driver control		Operation section
PSL	Power save LED		Operation section
ONL	Online LED		Operation section
PSW	Start button control		Operation section
KEYIN2#	Key scan input	Key detection control	Operation section
OUTA+	Scanner motor	Scanner motor phase control	Optical drive section
OUTB+	Scanner motor	Scanner motor phase control	Optical drive section
OUTA-	Scanner motor	Scanner motor phase control	Optical drive section
OUTB-	Scanner motor	Scanner motor phase control	Optical drive section
VCL	Copy lamp	Copy lamp control	Scanner unit section
(VSAMP)	AFE	AFE control signal	Scanner unit section
CCD-TG	CCD	CCD control signal	Scanner unit section
CCD-RS	CCD	CCD control signal	Scanner unit section
(BSAMP)	AFE	AFE control signal	Scanner unit section
CCD-CP	CCD	CCD control signal	Scanner unit section
(AFE_SDI)	AFE	AFE serial data	Scanner unit section
CCD_PHI2	CCD	CCD control signal	Scanner unit section
CCD_PHI1	CCD	CCD control signal	Scanner unit section
(AFE_SEN)	AFE	AFE control signal	Scanner unit section
(ADCLK)	AFE	AFE control signal	Scanner unit section
(AFE_SCK)	AFE	AFE control signal	Scanner unit section
(AFE_DB7)	AFE	Image scan data	Scanner unit section

Signal name	Name	Function/Operation	Section
MHPS	MHPS sensor	Carriage HP detection	Optical section
(AFE_DB5)	AFE	Image scan data	Scanner unit section
(AFE_DB6)	AFE	Image scan data	Scanner unit section
(AFE_DB4)	AFE	Image scan data	Scanner unit section
(AFE_DB3)	AFE	Image scan data	Scanner unit section
(AFE_DB2)	AFE	Image scan data	Scanner unit section
(AFE_DB1)	AFE	Image scan data	Scanner unit section
(AFE_DB0)	AFE	Image scan data	Scanner unit section
TCS	Toner sensor	Toner quantity detection	Developing section
DVSEL	Developing tank detection		Developing section
/BIAS	HV bias signal	HV bias drive	Process section
/TC	HV TC signal	Transfer charger grid control	Process section
/GRIDL	HV grid signal	Main charger grid control	Process section
/MC	HV MC signal	Main charger control	Process section
/POFF	Low voltage power	Output power control	Power section
FW	Low voltage power	Zero cross detection	Power section
/PR	Heater lamp	Power relay control	Power section
HLOUT	Heater lamp	Heater lamp control	Power section
SPMT_0	SPF motor	SPF motor phase control	SPF section
SPMT_2	SPF motor	SPF motor phase control	SPF section
SPMT_1	SPF motor	SPF motor phase control	SPF section
SPMT_3	SPF motor	SPF motor phase control	SPF section
SPID	SPID sensor	SPF UN paper entry sensor	SPF section
LEDSPID	SPID sensor power		SPF section
SPPD	SPPD sensor	SPF transport detection	SPF section
LEDSPPD	SPPD sensor power		SPF section
/CPFS2	2nd CS pickup solenoid		2nd cassette section
PPD3	PPD3 sensor	2nd CS paper transport detection	2nd cassette section
PD2	PD2 SW sensor	2nd CS paper width detection	2nd cassette section
CED2	2nd CS cassette detection		2nd cassette section
/REV	IEEE1284	/REV signal	Network section
/INIT	IEEE1284	/INIT signal	Network section
/SLCTIN	IEEE1284	/SLCTIN signal	Network section
/AUTOFD	IEEE1284	/AUTOFD signal	Network section
/STB	IEEE1284	/STB signal	Network section
/FAULT	IEEE1284	/FAULT signal	Network section
SLCT	IEEE1284	SLCT signal	Network section
PE	IEEE1284	PE signal	Network section
BUSY	IEEE1284	BUSY signal	Network section
/ACK	IEEE1284	/ACK signal	Network section
PARAD7	IEEE1284	Data bus	Network section
PARAD6	IEEE1284	Data bus	Network section
PARAD5	IEEE1284	Data bus	Network section
PARAD4	IEEE1284	Data bus	Network section
PARAD3	IEEE1284	Data bus	Network section
PARAD2	IEEE1284	Data bus	Network section
PARAD1	IEEE1284	Data bus	Network section
PARAD0	IEEE1284	Data bus	Network section
/OA_RST	Option reset	Reset signal to the NIC PWB	Network section

TITLE	MCU PWB Circuit diagram(Ver 2.0) -CPU section-	ISSD	ENG. Dept.4/DOCUMENT DIV	U.CODE	CPWBX0205QS**	APPD	CHKD	CHKD	DWN	DATE	P. No	1 / 14
		MODEL	AL2030/AL2040	DWN No.						Thursday, March 01, 2007		

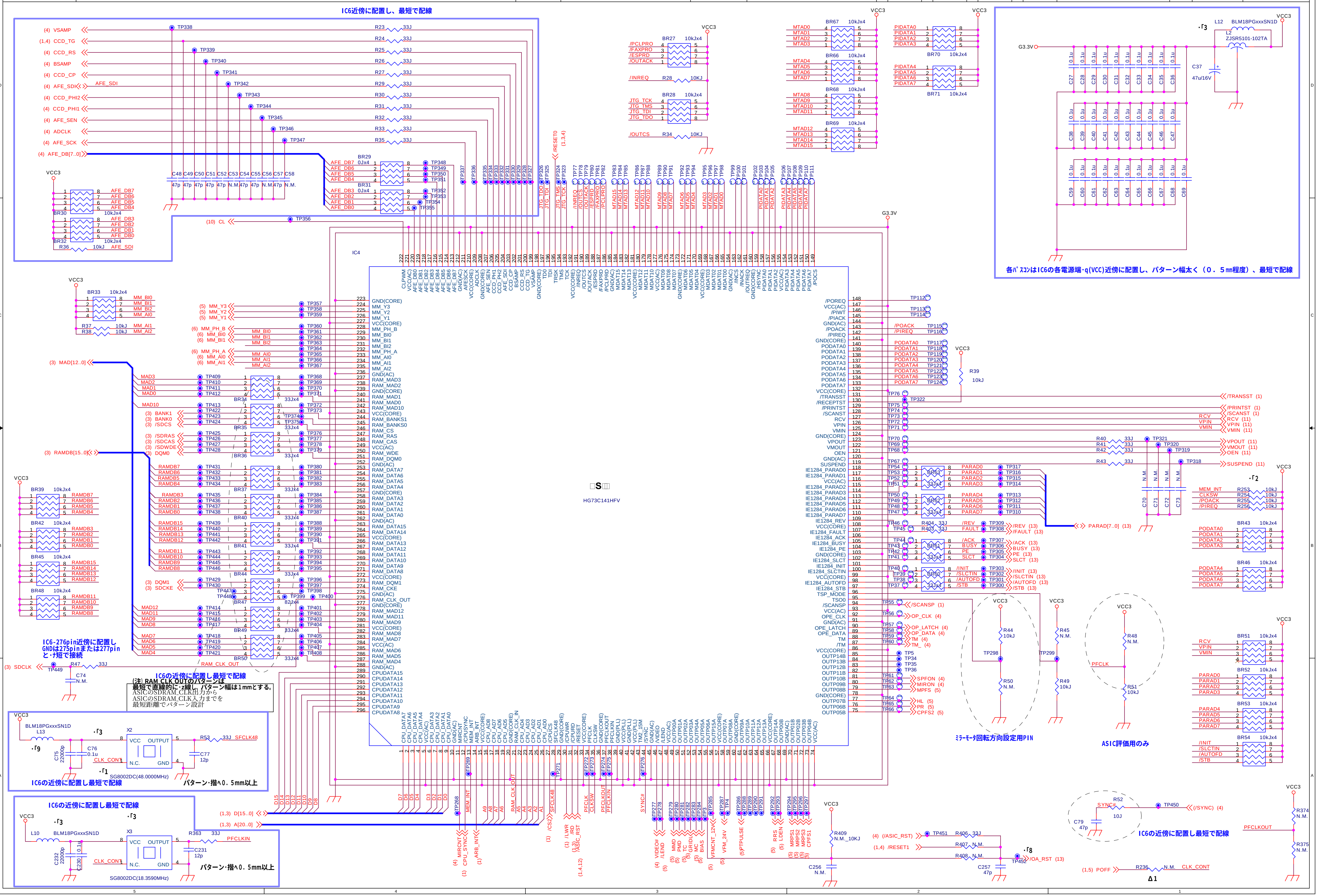


Δ1 C1,C5を22pFから27pFへ変更

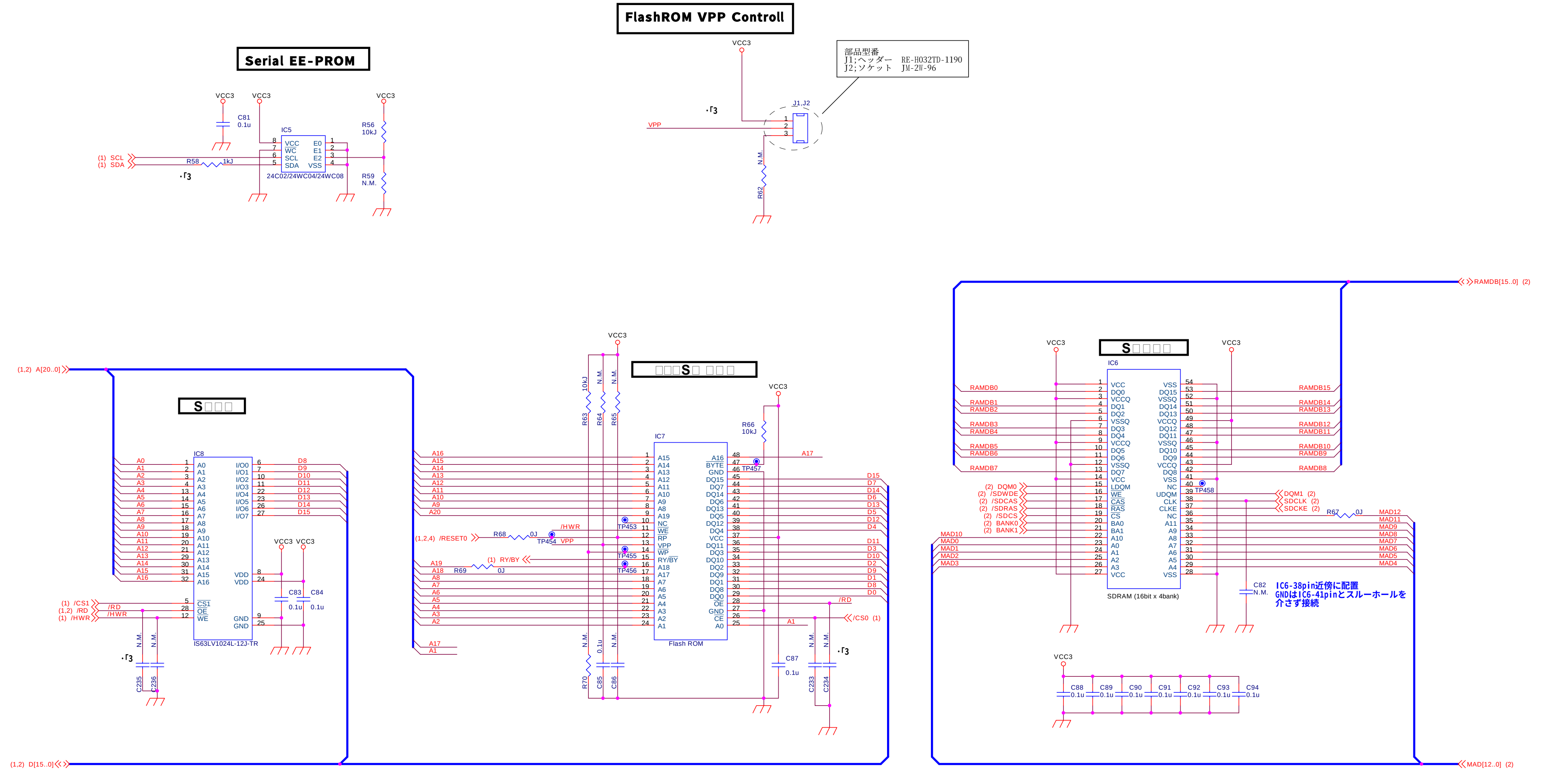
When IC1 is,	mounted	NOT mounted
R7(*3)	OPEN	0J
R4(*1)	OPEN	680J
R8(*4)	22J	OPEN
R3(*2)	0J	OPEN
C5(*5)	27pF	15pF
C1(*6)	27pF	15pF

*R3,R4,C1, and C5 are temtative

TITLE	MCU PWB Circuit diagram(Ver 2.0) -Graphic_ASIC section-	ISSD	ENG. Dept.4/DOCUMENT DIV	U.CODE	CPWBX0205QS**	APPD	CHKD	CHKD	DWN	DATE	P. No	2 / 14
		MODEL	AL2030/AL2040	DWN No.						Thursday, March 01, 2007		



TITLE	MCU PWB Circuit diagram(Ver 2.0) -Memory section-	ISSD	ENG. Dept.4/DOCUMENT DIV	U.CODE	CPWBX0205QS**	APPD	CHKD	CHKD	DWN	DATE	P. No	3 / 14
		MODEL	AL2030/AL2040	DWN No.						Thursday, March 01, 2007		

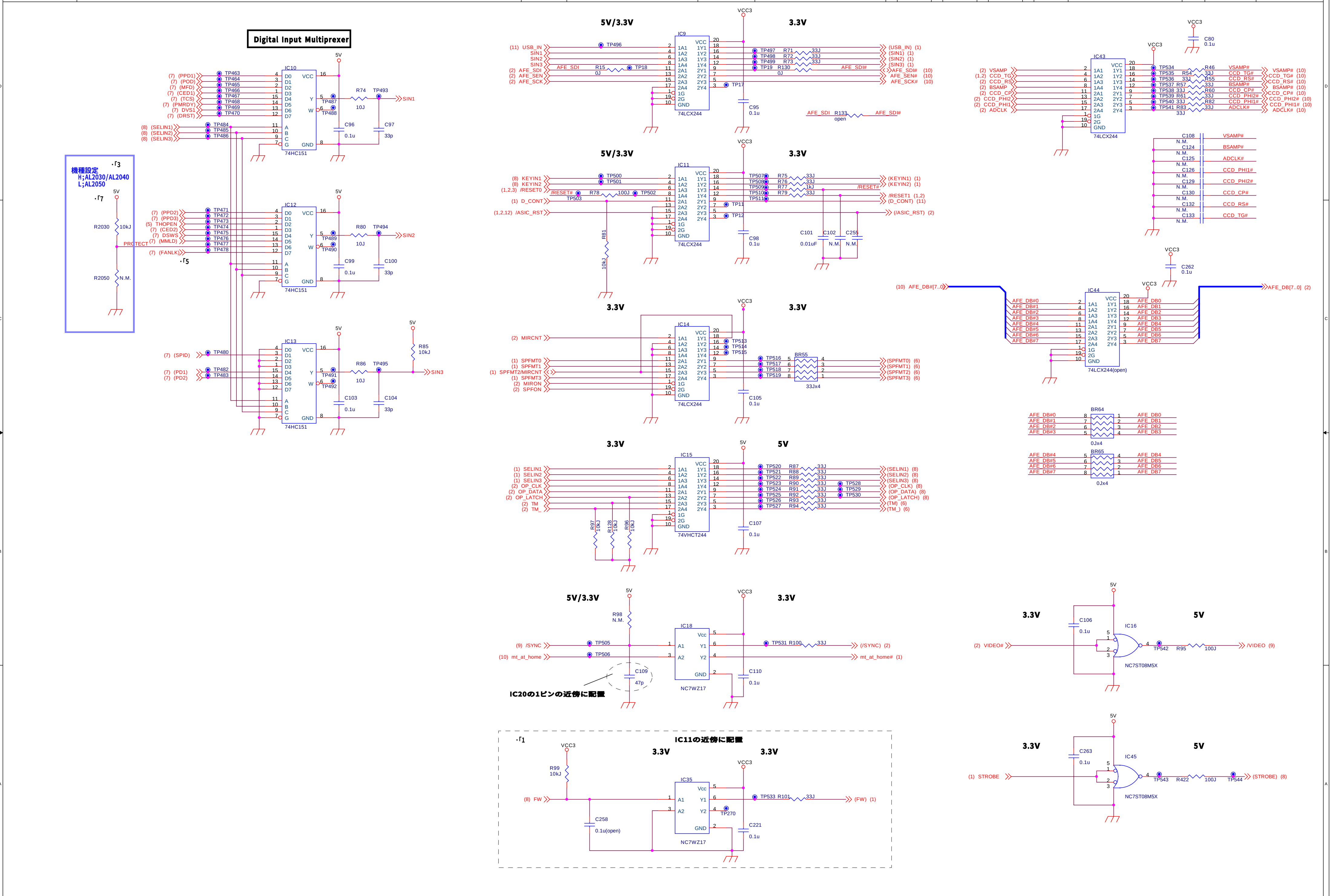


IC7

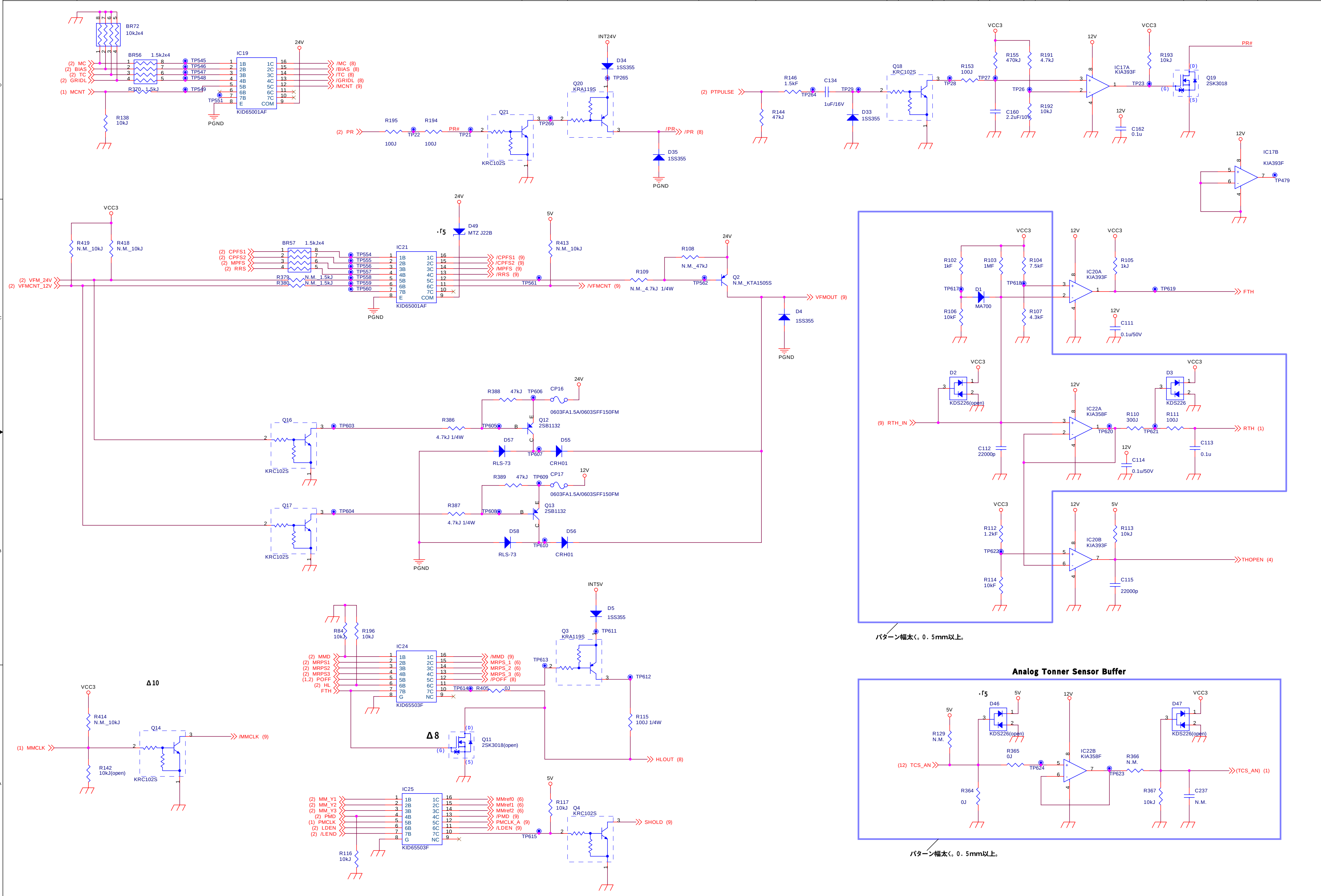
	LH28F800BJE-PBTL90(LHF80JZP) LH28F160BJE-BTL90(LHF16JT2)	S29AL008D70TFI020# S29GL016A90TFIR20#
R81	10kJ	OPEN
R82	OPEN (J1,J2がN.M.の時：0J)	OPEN
R86	0J	OPEN
R83	OPEN	10kJ
C86	0.1u	OPEN
C87	OPEN	22000p

IC6	Vendor/Type
128Mb(2Mx16bitx4bank)	**K4S281632I-UC60(Samsung)**
64Mb(1Mx16bitx4bank)	**K4S641632K-UC75(Samsung)**

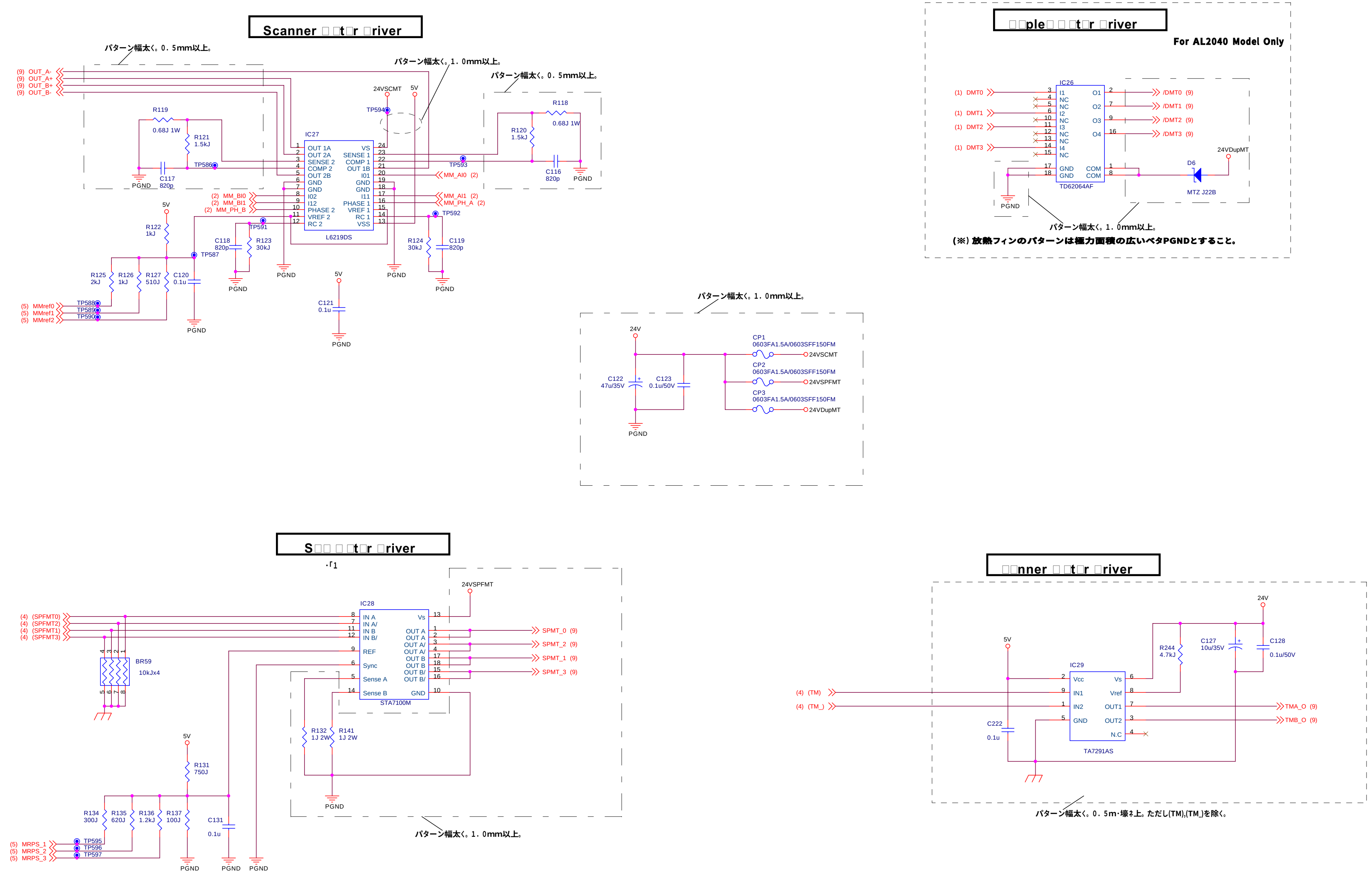
TITLE	MCU PWB Circuit diagram(Ver 2.0) -Driver section 1-	ISSD	ENG. Dept.4/DOCUMENT DIV	U.CODE	CPWBX0205QS**	APPD		CHKD		CHKD		DWN		DATE	P. No	4 / 14
		MODEL	AL2030/AL2040	DWN No.										Thursday, March 01, 2007		



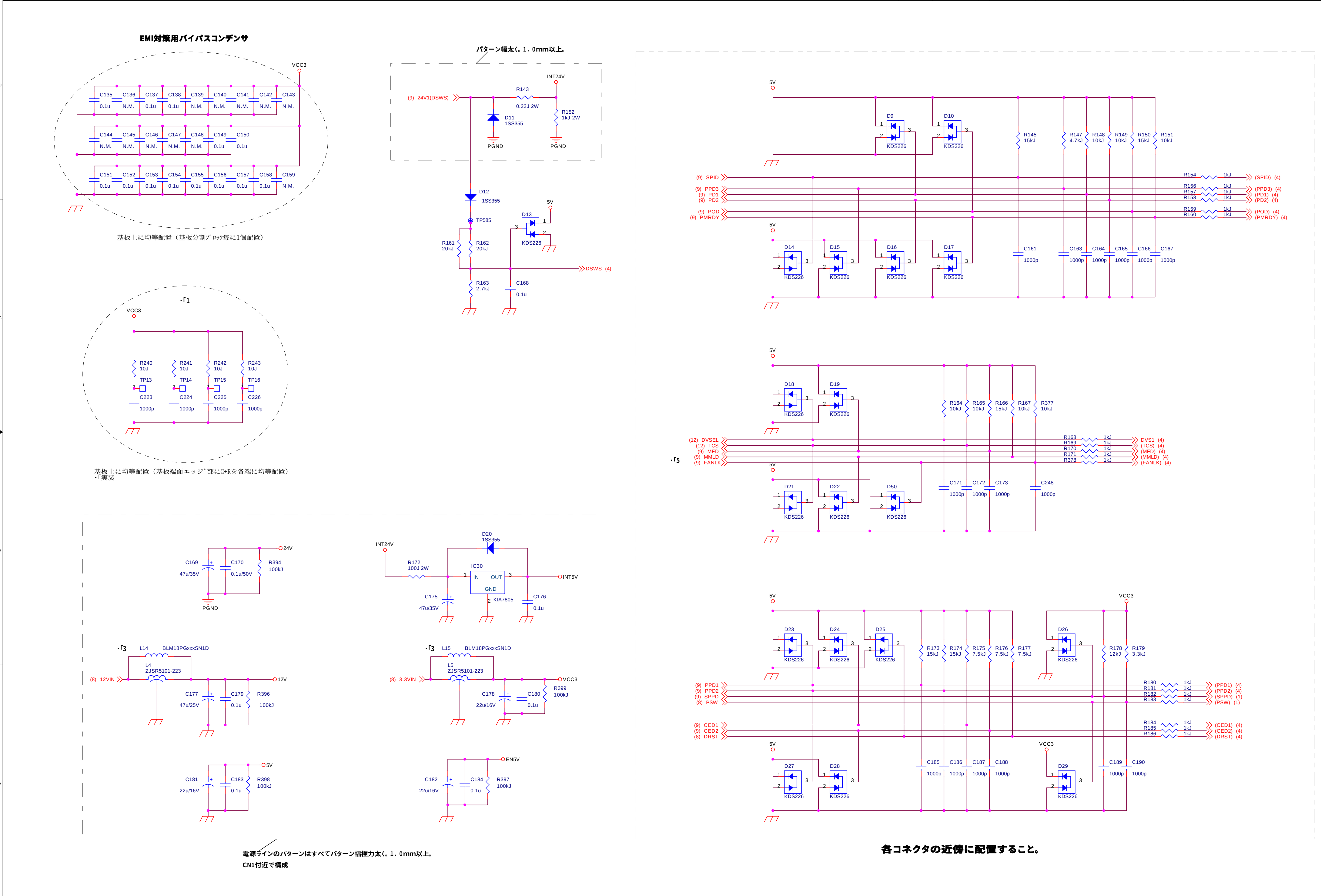
TITLE	MCU PWB Circuit diagram(Ver 2.0) -Driver section 2-	ISSD	ENG. Dept.4/DOCUMENT DIV	U.CODE	CPWBX0205QS**	APPD	CHKD	CHKD	DWN	DATE	P. No	5 / 14
		MODEL	AL2030/AL2040	DWN No.						Thursday, March 01, 2007		



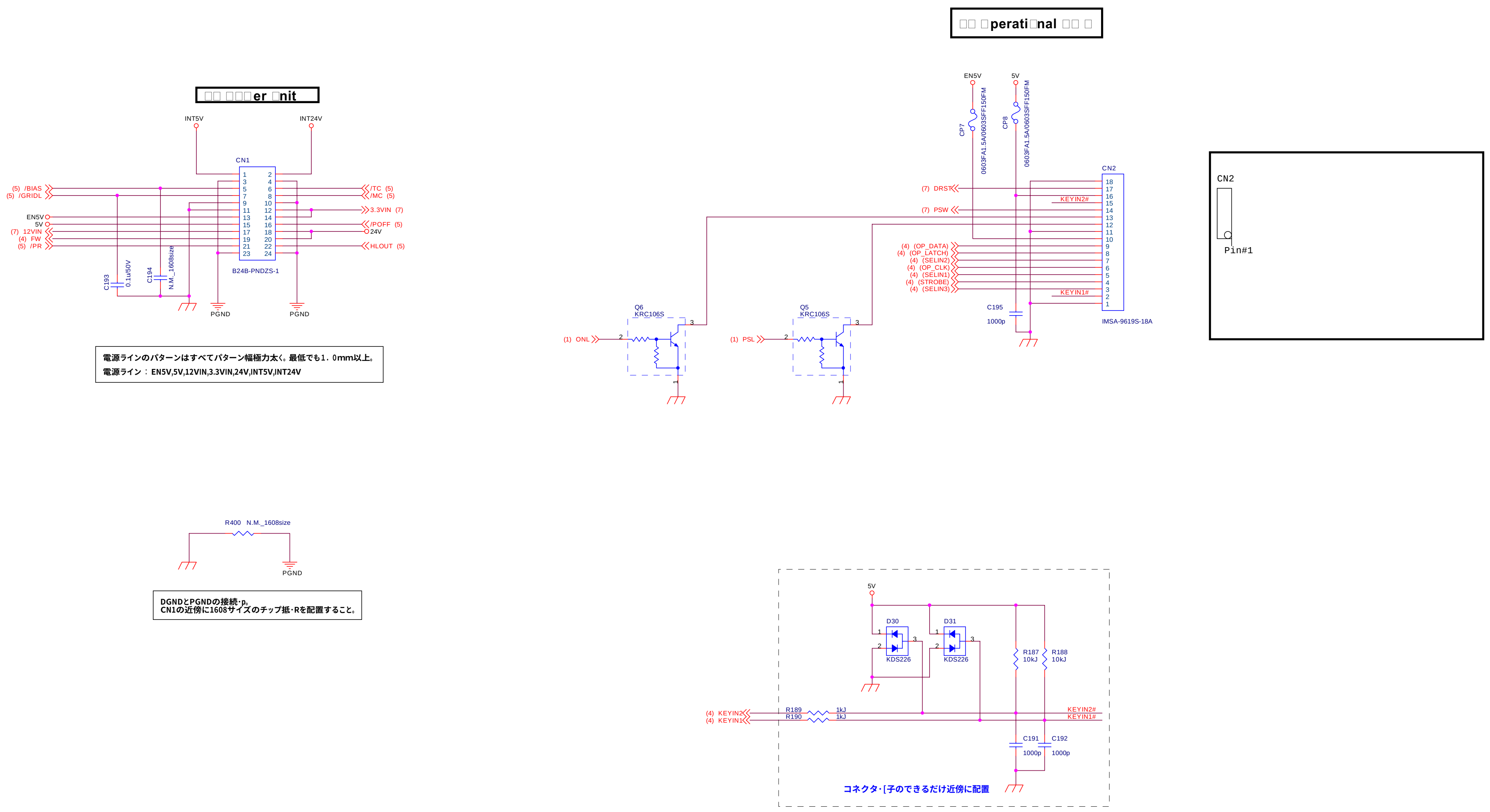
TITLE	MCU PWB Circuit diagram(Ver 2.0) -Driver section 3-	ISSD	ENG. Dept.4/DOCUMENT DIV	U.CODE	CPWBX0205QS**	APPD	CHKD	CHKD	DWN	DATE	P. No	6 / 14
		MODEL	AL2030/AL2040	DWN No.						Thursday, March 01, 2007		



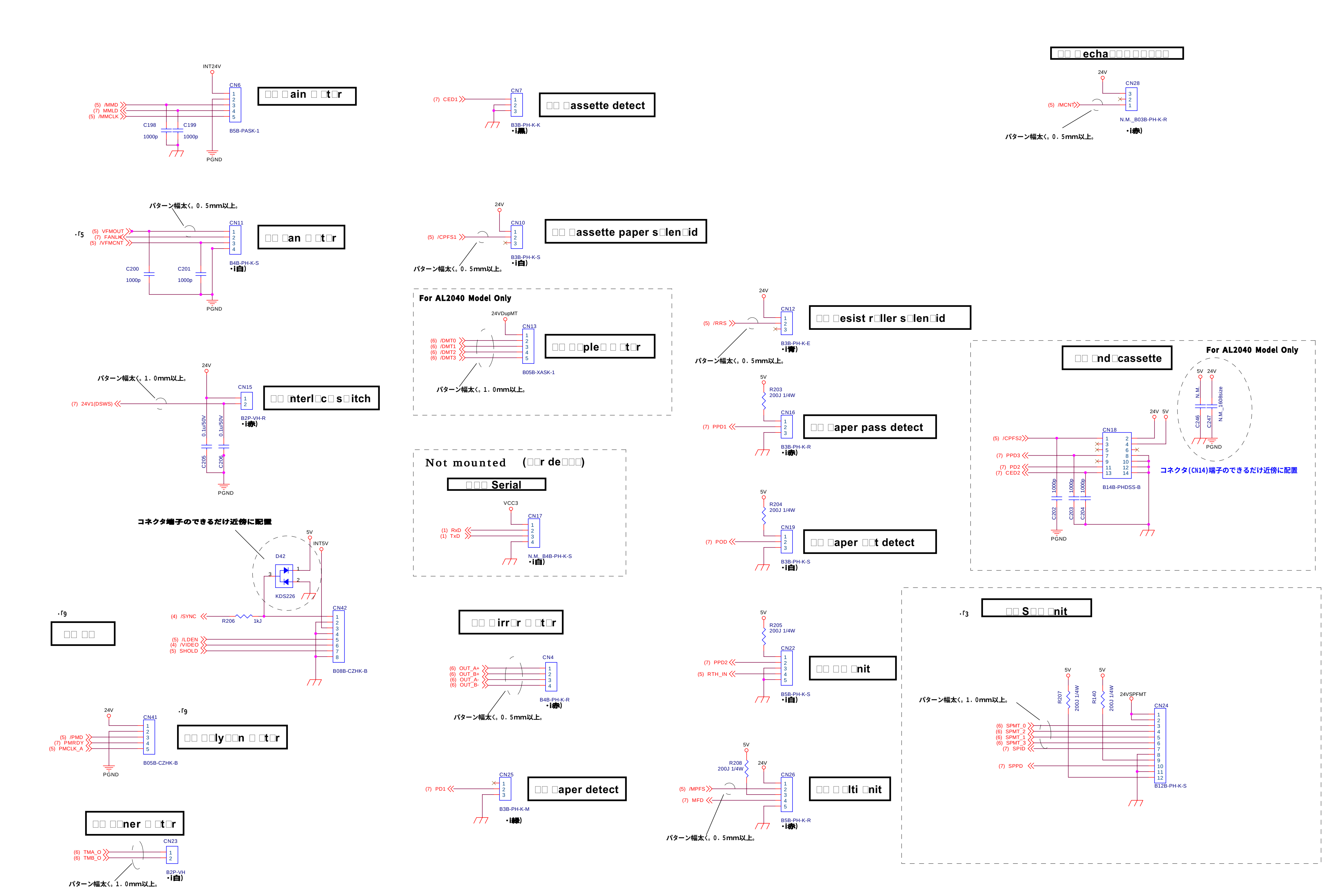
TITLE	MCU PWB Circuit diagram(Ver 2.0) -Noise filter/Pull-up section-	ISSD	ENG. Dept.4/DOCUMENT DIV	U.CODE	CPWBX0205QS**	APPD	CHKD	CHKD	DWN	DATE	P. No	7 / 14
		MODEL	AL2030/AL2040	DWN No.						Thursday, March 01, 2007		



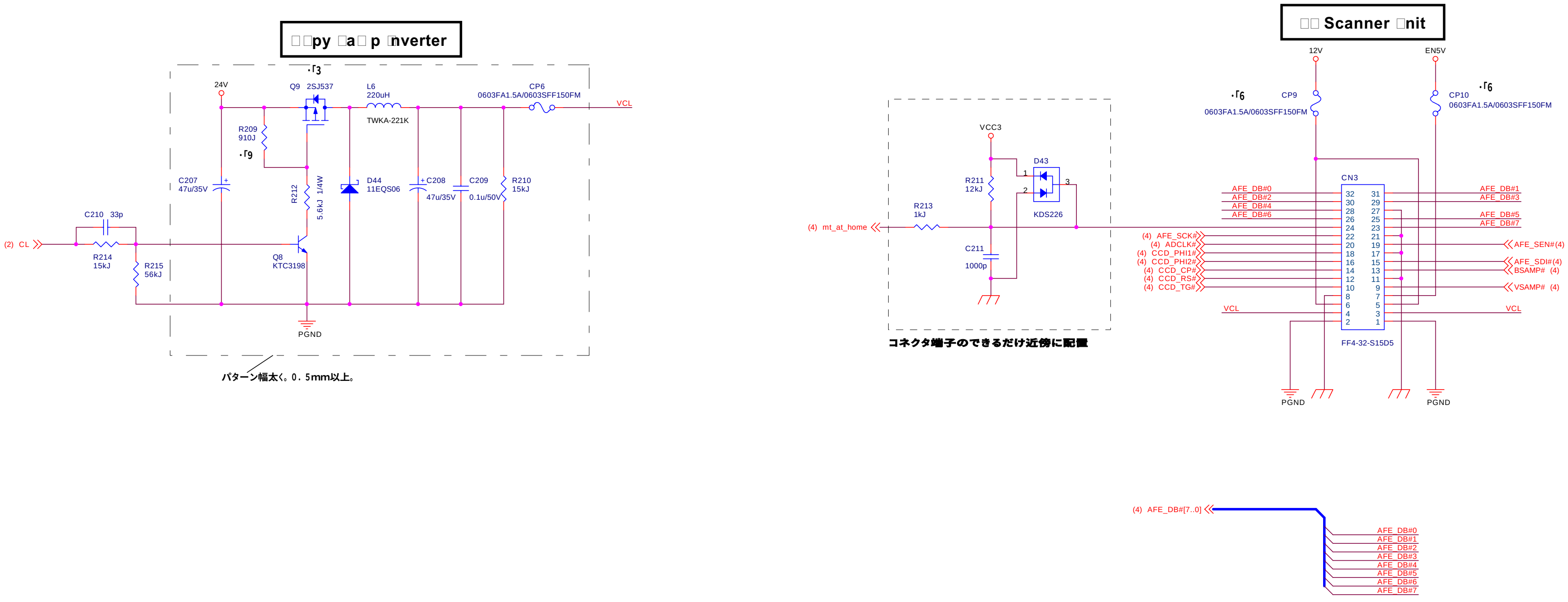
TITLE	MCU PWB Circuit diagram(Ver 2.0) -Connector section 1-	ISSD	ENG. Dept.4/DOCUMENT DIV	U.CODE	CPWBX0205QS**	APPD	CHKD	CHKD	DWN	DATE	P. No	8 / 14
		MODEL	AL2030/AL2040	DWN No.						Thursday, March 01, 2007		



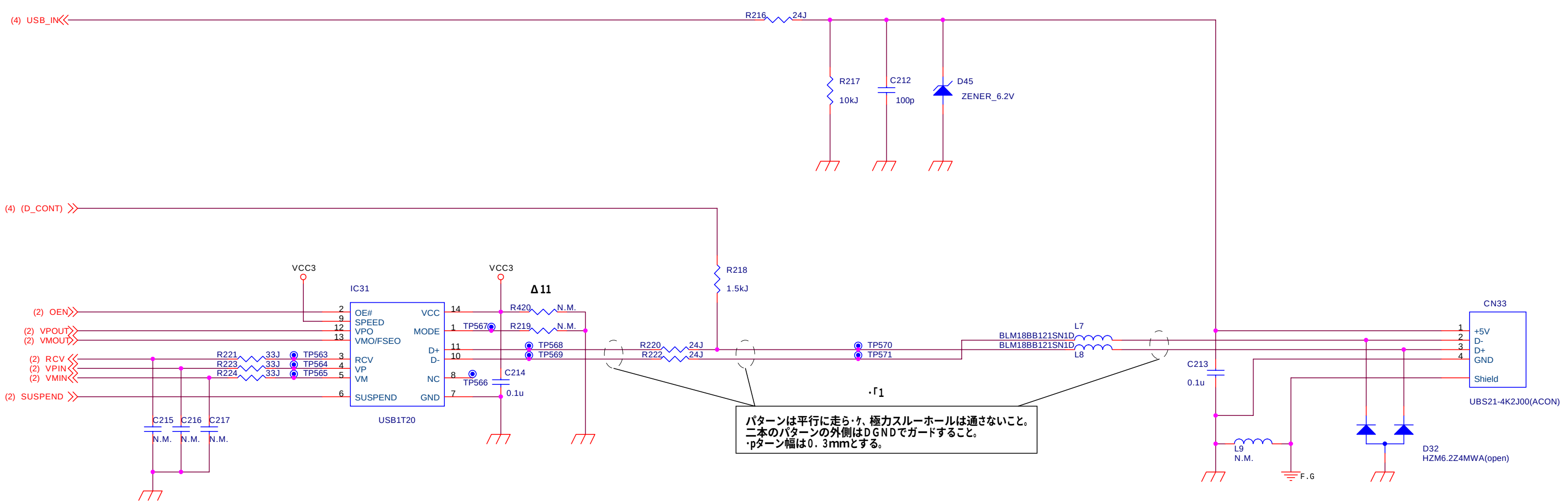
TITLE	MCU PWB Circuit diagram(Ver 2.0) -Connector section 2-	ISSD	ENG. Dept.4/DOCUMENT DIV	U.CODE	CPWBX0205QS**	APPD	CHKD	CHKD	DWN	DATE	P. No	9 / 14
		MODEL	AL2030/AL2040	DWN No.						Thursday, March 01, 2007		



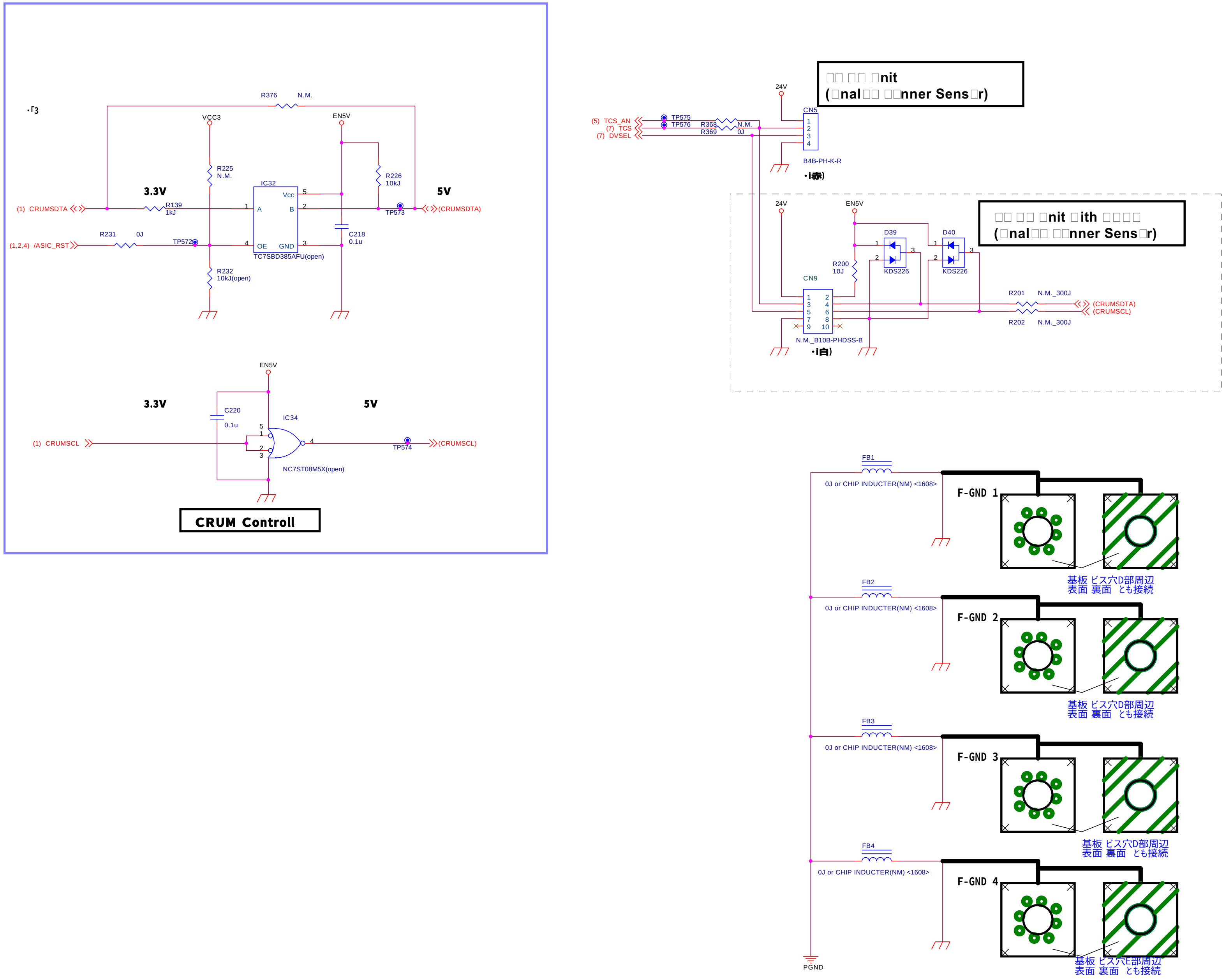
TITLE	MCU PWB Circuit diagram(Ver 2.0) -Scanner I/F section-	ISSD	ENG. Dept.4/DOCUMENT DIV	U.CODE	CPWBX0205QS**	APPD		CHKD		CHKD		DWN		DATE	P. No	10/ 14
		MODEL	AL2030/AL2040	DWN No.										Thursday, March 01, 2007		



TITLE	MCU PWB Circuit diagram(Ver 2.0) -USB2.0(FULL) I/F section-	ISSD	ENG. Dept.4/DOCUMENT DIV	U.CODE	CPWBX0205QS**	APPD		CHKD		CHKD		DWN		DATE	P. No	11/ 14	S□□□□
		MODEL	AL2030/AL2040	DWN No.										Thursday, March 01, 2007			

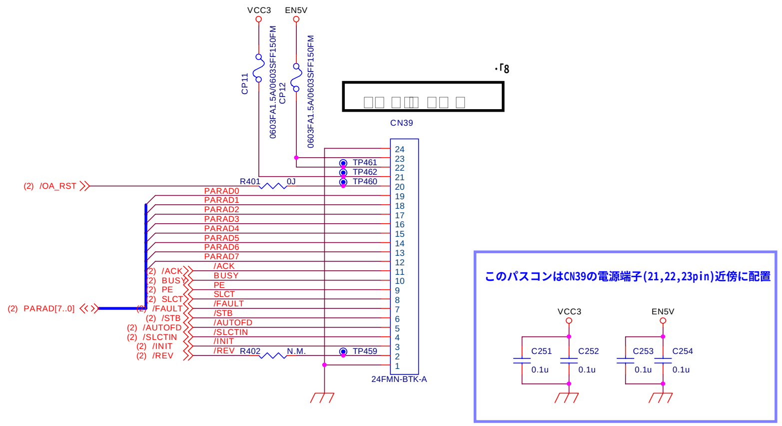


TITLE	MCU PWB Circuit diagram(Ver 2.0) -CRUM I/F section-	ISSD	ENG. Dept.4/DOCUMENT DIV	U.CODE	CPWBX0205QS**	APPD		CHKD		CHKD		DWN		DATE	P. No	12/ 14	S□□□□
		MODEL	AL2030/AL2040	DWN No.										Thursday, March 01, 2007			

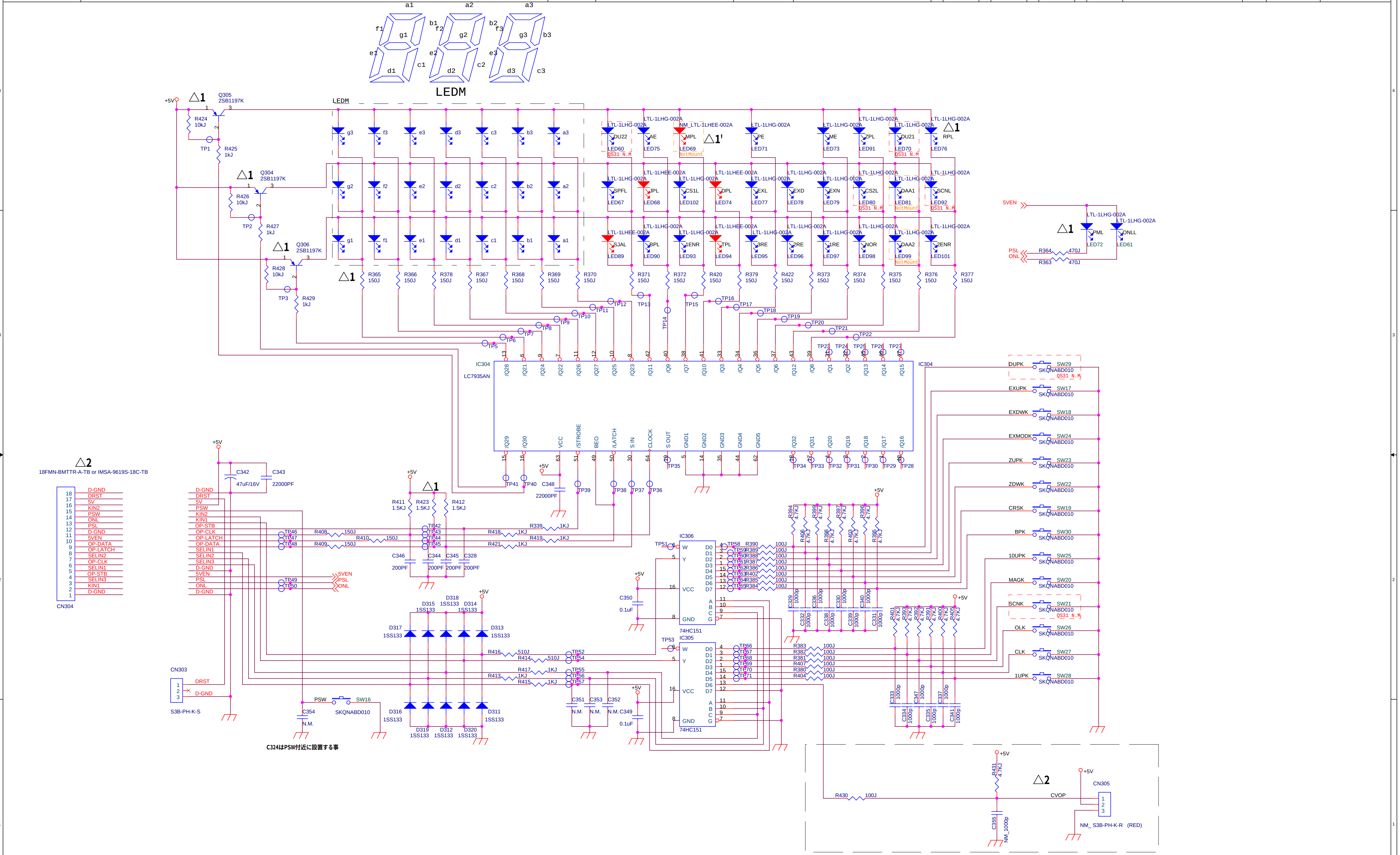


TITLE	MCU PWB Circuit diagram(Ver 2.0) -NIC Interface section-	ISSD	ENG. Dept.4/DOCUMENT DIV	U.CODE	CPWBX0205QS**	APPD		CHKD		CHKD		DWN		DATE	P. No	13/ 14
		MODEL	AL2030/AL2040	DWN No.										Thursday, March 01, 2007		

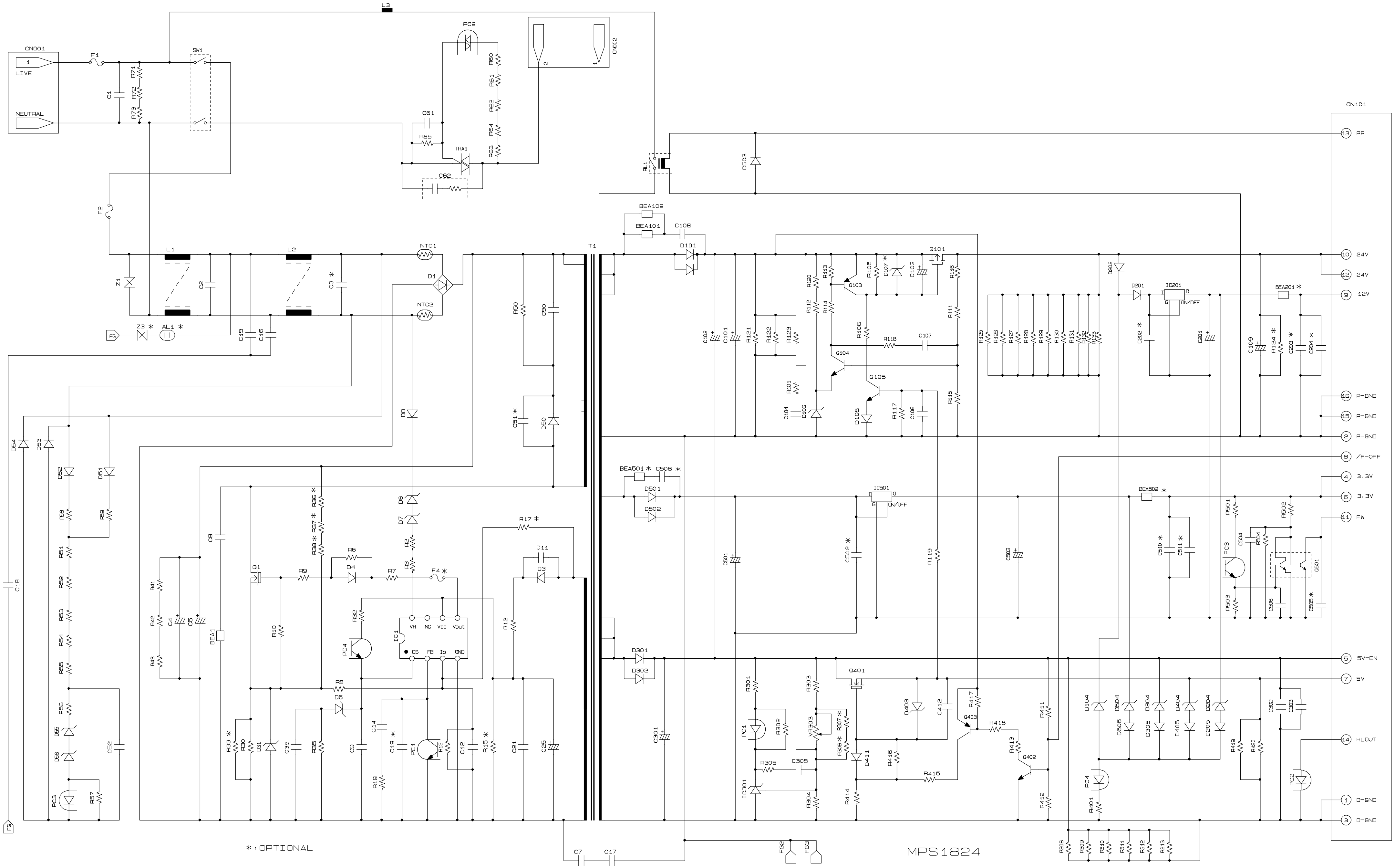
For AL2040 Model Only



TITLE	OPE PWB (7SEG)	ISSD	ENG. Dept.4/DOCUMENT SYSTEM DIV	U.CODE	CPWBF0208QS**(QPWBF0208QS2Z)	APPD		CHKD		CHKD		DWN		DATE	P. No	1 / 1	SHARP
		MODEL	Jaguar3	DWN No.	PA845201 (PA845202)									Thursday, March 15, 2007			



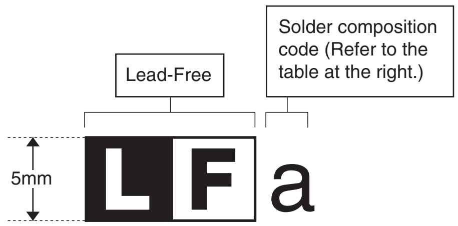
	DATE	REVISE		
△2	2007/3/9	CVOP検知信号を追加。 コネクタをロック付きに変更。	Ver,1.5	
△1	2007/2/16	トランジスタ変更に伴う変更 (Q304,305,306 : KRA225S→2SB1197K, R424〜429追加) OP-STB信号にプルアップ抵抗を追加 (R423) LED電流制限抵抗の定数変更 (120J→150J) LEDマトリックスの変更 (RPL⇔PML) FFCコネクタ SMT品に変更	Ver,1.0	
	DATE	REVISE	DRAWING INFO	PREPA


CN001
LIVE
NEUTRAL
F1
F2
C1
R71
R72
R73
SW1
L3
PC2
R60
R61
R62
R64
R63
C61
R65
TRA1
C62
CN002
RL1
D503
BEA102
BEA101
C108
D101
L1
L2
C2
C3 *
Z1
Z3 *
AL1 *
FG
C15
C16
NTC1
NTC2
D1
T1
R50
C50
C51 *
D50
D8
D6
D7
R2
R3
F4 *
R7
R6
D4
R9
Q1
R36 *
R37 *
R38 *
R17 *
C11
D3
IC1
VH
NC
Vcc
Vout
CS
FB
Is
GND
R32
PC4
R10
R8
D5
R12
C8
BEA1
R41
R42
R43
C4
C5
R33 *
R30
D31
C35
R35
C9
C14
C19 *
R19
PC1
R13
C12
R15 *
C21
C25
C18
D54
D53
D52
D51
R68
R69
R51
R52
R53
R54
R55
R56
D55
D56
PC3
R57
C52
*:OPTIONAL
C7
C17
FG2
FG3
MPS1824
Q101
R120
R113
Q103
R105
D107 *
C103
R116
R112
R114
R106
R118
C107
R111
Q104
Q105
R101
C104
D106
D108
R117
C106
R115
C102
C101
R121
R122
R123
D202
D201
IC201
ON/OFF
C202 *
C201
R125
R126
R127
R128
R129
R130
R131
R132
R133
BEA201 *
C109
R124 *
C203 *
C204 *
BEA501 *
C508 *
D501
D502
IC501
C501
C502 *
R119
C503
BEA502 *
C510 *
C511 *
R501
R502
C504
R504
Q501
R503
C506
C505 *
D301
D302
C301
R301
PC1
R302
R303
VR303
R307 *
R306 *
R305
C305
IC301
R304
Q401
D403
C412
R417
D411
R416
R415
R414
Q403
R418
R413
Q402
R412
R411
D104
PC4
R401
D504
D505
D304
D305
D404
D405
D204
D205
R419
R420
C302
C303
PC2
R308
R309
R310
R311
R312
R313
CN101
13 PR
10 24V
12 24V
9 12V
16 P-GND
15 P-GND
2 P-GND
8 /P-OFF
4 3.3V
6 3.3V
11 FW
5 5V-EN
7 5V
14 HLOUT
1 D-GND
3 D-GND

LEAD-FREE SOLDER

The PWB's of this model employs lead-free solder. The "LF" marks indicated on the PWB's and the Service Manual mean "Lead-Free" solder.
The alphabet following the LF mark shows the kind of lead-free solder.

Example:



<Solder composition code of lead-free solder>

Solder composition	Solder composition code
Sn-Ag-Cu	a
Sn-Ag-Bi Sn-Ag-Bi-Cu	b
Sn-Zn-Bi	z
Sn-In-Ag-Bi	i
Sn-Cu-Ni	n
Sn-Ag-Sb	s
Bi-Sn-Ag-P Bi-Sn-Ag	p

(1) NOTE FOR THE USE OF LEAD-FREE SOLDER THREAD

When repairing a lead-free solder PWB, use lead-free solder thread.

Never use conventional lead solder thread, which may cause a breakdown or an accident.

Since the melting point of lead-free solder thread is about 40°C higher than that of conventional lead solder thread, the use of the exclusive-use soldering iron is recommendable.

(2) NOTE FOR SOLDERING WORK

Since the melting point of lead-free solder is about 220°C, which is about 40°C higher than that of conventional lead solder, and its soldering capacity is inferior to conventional one, it is apt to keep the soldering iron in contact with the PWB for longer time. This may cause land separation or may exceed the heat-resistive temperature of components. Use enough care to separate the soldering iron from the PWB when completion of soldering is confirmed.

Since lead-free solder includes a greater quantity of tin, the iron tip may corrode easily. Turn ON/OFF the soldering iron power frequently.

If different-kind solder remains on the soldering iron tip, it is melted together with lead-free solder. To avoid this, clean the soldering iron tip after completion of soldering work.

If the soldering iron tip is discolored black during soldering work, clean and file the tip with steel wool or a fine filer.

CAUTION FOR BATTERY REPLACEMENT

(Danish) ADVARSEL !
Lithiumbatteri – Eksplosionsfare ved fejlagtig håndtering.
Udskiftning må kun ske med batteri
af samme fabrikat og type.
Levér det brugte batteri tilbage til leverandoren.

(English) Caution !
Danger of explosion if battery is incorrectly replaced.
Replace only with the same or equivalent type
recommended by the manufacturer.
Dispose of used batteries according to manufacturer's instructions.

(Finnish) VAROITUS
Paristo voi räjähtää, jos se on virheellisesti asennettu.
Vaihda paristo ainoastaan laitevalmistajan suosittelemaan
tyyppiin. Hävitä käytetty paristo valmistajan ohjeiden
mukaisesti.

(French) ATTENTION
Il y a danger d'explosion s' il y a remplacement incorrect
de la batterie. Remplacer uniquement avec une batterie du
même type ou d'un type équivalent recommandé par
le constructeur.
Mettre au rebut les batteries usagées conformément aux
instructions du fabricant.

(Swedish) VARNING
Explosionsfara vid felaktigt batteribyte.
Använd samma batterityp eller en ekvivalent
typ som rekommenderas av apparattillverkaren.
Kassera använt batteri enligt fabrikantens
instruktion.

(German) Achtung
Explosionsgefahr bei Verwendung inkorrekter Batterien.
Als Ersatzbatterien dürfen nur Batterien vom gleichen Typ oder
vom Hersteller empfohlene Batterien verwendet werden.
Entsorgung der gebrauchten Batterien nur nach den vom
Hersteller angegebenen Anweisungen.

CAUTION FOR BATTERY DISPOSAL

(For USA, CANADA)

"BATTERY DISPOSAL"
THIS PRODUCT CONTAINS A LITHIUM PRIMARY
(MANGANESS DIOXIDE) MEMORY BACK-UP BATTERY
THAT MUST BE DISPOSED OF PROPERLY. REMOVE THE
BATTERY FROM THE PRODUCT AND CONTACT YOUR
LOCAL ENVIRONMENTAL AGENCIES FOR INFORMATION
ON RECYCLING AND DISPOSAL OPTIONS.

"TRAITEMENT DES PILES USAGÉES"
CE PRODUIT CONTIENT UNE PILE DE SAUVEGARDE DE
MÉMOIRE LITHIUM PRIMAIRE (DIOXYDE DE MANGANÈSE)
QUI DOIT ÊTRE TRAITÉE CORRECTEMENT. ENLEVEZ LA
PILE DU PRODUIT ET PRENEZ CONTACT AVEC VOTRE
AGENCE ENVIRONNEMENTALE LOCALE POUR DES
INFORMATIONS SUR LES MÉTHODES DE RECYCLAGE ET
DE TRAITEMENT.

SHARP

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